

ASSESSMENT OF CORE COMPETENCIES OF  
AGRICULTURAL EXTENSION PROFESSIONALS IN NEPAL

By

Ramjee Prasad Ghimire

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## **ABSTRACT**

### **ASSESSMENT OF CORE COMPETENCIES OF AGRICULTURAL EXTENSION PROFESSIONALS IN NEPAL**

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Agricultural extension services are under pressure to improve their services and contribute more to agricultural development. Extension services require human resources that are competent both technically as well as in process skills. Little is known about whether and how competent extension professionals are to serve in the changing context and as demanded by their clients. Examining the competencies of extension staff members is vital to management being cognizant of training and educational needs of their staff members as well as being able to effectively mobilize them to accomplish extension tasks. This four-paper dissertation seeks to assess how Nepalese extension professionals perceive extension core competencies.

Using extension experts' input and information drawn from a literature review, the first paper identifies areas of core competency that the agricultural extension professionals in Nepal need to possess to effectively deliver extension services to farmers. The eight core competency areas identified are communication, program planning, program implementation, personal and professional development, education and informational technology, diversity, program evaluation, and technical subject matter expertise. The second paper uses self-administered in-person and web based survey data and discusses the perceptions of importance of core competencies of extension professionals. Respondents perceived core competencies to be very important to their work are those related to personal and professional development, followed by communication skills. The third paper examines extension professionals' levels in the core competencies. The findings show a moderate level of competency among extension professionals

and a clear gap exists between the perceived level of importance and current level of competency. The widest such gap is in educational and informational technology followed closely by technical subject matter expertise and program evaluation. The fourth paper assesses respondents' perceptions of level of competency pertaining to demand-driven extension and ways to acquire competencies. Respondents felt only moderately competent to demand-driven extension competency. Generally, all four ways—in-service, preservice, basic induction and workshops/seminars/webinars—seem to be appropriate to acquire core competencies, but in particular, respondents from government organizations preferred in-service and/or basic induction training to acquire core competency than respondents from non-governmental organizations did. The study has several implications for the preservice and in-service agricultural education and training in Nepal.

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This work is dedicated to the smallholder farmers of the developing world who live hand to mouth despite spending most of their time on farms.

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## **CHAPTER 1 INTRODUCTION**

Traditionally, agricultural extension services have been top-down, supply-driven, accountability lacking and extension agents-led with little or no participation of beneficiaries in the extension process. As a result, agricultural growth is slow. Summarizing the issues raised at the Organization for Economic Cooperation and Development (OECD) conference in June 2011, David Blandford stated that the agricultural sector faces the challenges of a growing population combined with increasing food demand, while less land is available for cultivation (OECD, 2012). To strengthen extension services, Blandford noted the need for improving effectiveness in the supply and diffusion of agricultural technologies, changing institutional structures, and increasing collaboration and cooperation between the public and private sectors (OECD, 2012). The changing demography of farming communities, advancing technologies, increase in competition for resources and increase in globalization warrant a shift in the extension paradigm to a demand-driven, participatory and pluralistic form. The shift in extension paradigm requires extension human resources, such as extension professionals, to be competent in both process and technical skills, so they help farming communities develop themselves.

Extension management should understand the dynamics of farming systems, have the ability to assess the resources needed to undertake extension tasks, examine whether an organization needs restructuring, remain current with advancing technology, and be able to adapt their programs and approaches accordingly (Cochran et al., 2012). Extension professionals play additional roles in helping farmers adapt to climatic changes, linking them to markets, and promoting gender integration in agriculture (Davis, 2015). Extension professionals, most of whom have had traditional schooling, should also have an understanding of social mobilization and the participatory program development process. According to Suvedi and Kaplowitz (2016), there is a need for a paradigm shift in developing country extension services from a technology

transfer to a process-skills orientation; from being extension agent-led to farmer-oriented and farmer-led; and from top-town to bottom-up. Extension professionals should be holistic (examining issues within broader contexts), and take their underlying components into account, rather than being reductionist (looking at issues objectively).

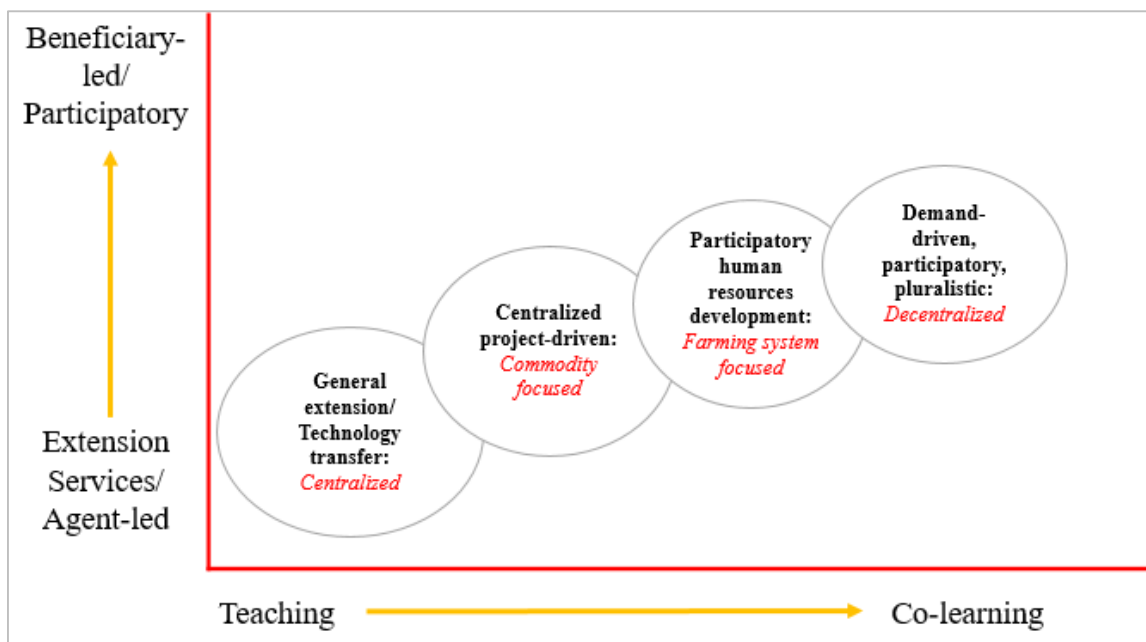


Figure 1: Evolution of extension approaches

Figure 1 shows the trajectory of extension approaches and how they have evolved through since extension was conceived in the early 1900s. The vertical axis denotes the level of participation of beneficiaries in the extension process, while the horizontal axis denotes the level of co-learning between extension workers and farmers. At the point where the two axes intersect, beneficiaries' participation in extension is very minimal to non-existent and there is no co-learning; the teaching is one-way—extension professionals teaching farmers. The first circle in Figure 1 shows a general technology transfer centralized approach to extension. The central governments were in charge of all extension, and non-governmental and private sector extension service providers were nonexistent. The commodity-focused approach followed. Under this

approach, extension services, including agricultural input, were channeled to certain agricultural commodities such as sugarcane, corn, rice, and cotton, with the aim of boosting commodity agricultural productivity. The farming system approach, also called participatory human resource development approach, was then launched. This approach was relatively more beneficiary-focused and participatory than earlier approaches. Extension agents would visit farmers and their farms, and work with the farmers to identify their problems and explore solutions for addressing those problems.

The fourth approach in the trajectory, which many extensionists advocate for, is a demand-driven, participatory and pluralistic approach. It emphasizes beneficiary participation in the extension process—from need identification to planning, implementation, monitoring, and evaluation. Farmers participate as collaborators and partners, and not as passive service recipients. Extension offers programs that farmers demand. Extension agents are accountable to farmers for their services. Multiple agencies could be providing extension services, and farmers are free to choose their service providers. In this approach, there is less teaching by extension agents; rather there is co-learning between farmers and extension workers. Farmers have experience and knowledge about their own farming systems. Working with farmers, extension agents could also learn many different things about those farming systems. Successful implementation of the demand-driven extension approach requires extension professionals to possess knowledge, skills and abilities about the extension processes that can help to enhance this approach.

According to Moyo and Hagmann (2000), managing the dynamic complexity facing agricultural services requires highly professional extension agents. Education and orientation



targeted to extension professionals should stimulate them to learn at all three levels—cognitive (knowledge), affective (emotions) and psychomotor (skills) (Moyo & Hagmann, 2000).

Discussion and debate about the need for process skills or core competencies among extension professionals is gaining wider currency. Indeed, having knowledge and resources are not all that matters; rather what matters most is how such knowledge and resources are utilized. Intelligence or knowledge only explains a part of what and how individuals work. Their skills, abilities, and attitudes are more pivotal in how they work. Knowing the levels of these traits is fundamental to maintaining competent human resources (Hay Group, 2003; McClelland, 1973).

In-service and preservice training are key to producing competent agricultural extension professionals who are capable of addressing extension problems. For this to happen, education and training should be tailored to per felt and field needs such as the use of local context-based extension tools, extension programs that focus on women's participation and market linkages. Against this backdrop, this dissertation seeks to examine the core competencies required for Nepalese extension professionals, and to discern gaps in core competencies among extension professionals—knowledge, attitude and skill gaps that may keep them from performing their tasks well and as their clients expect.

Figure 2 illustrates the conceptual framework of the study. The four objectives of the dissertation are: to identify a valid set of core competencies required for agricultural extension professionals in Nepal; to examine the perceived level of the importance of core competencies among extension professionals; to assess the level of core competencies among extension professionals; and determine the predictors of the core competencies.

This dissertation consists of six chapters. Chapters 2 through 5 have been developed as an independent paper. Each of these chapters begins with an introduction followed by study goals

and objectives, study methods, results, discussion, conclusions and recommendations. The last chapter presents an overall conclusion to the study.

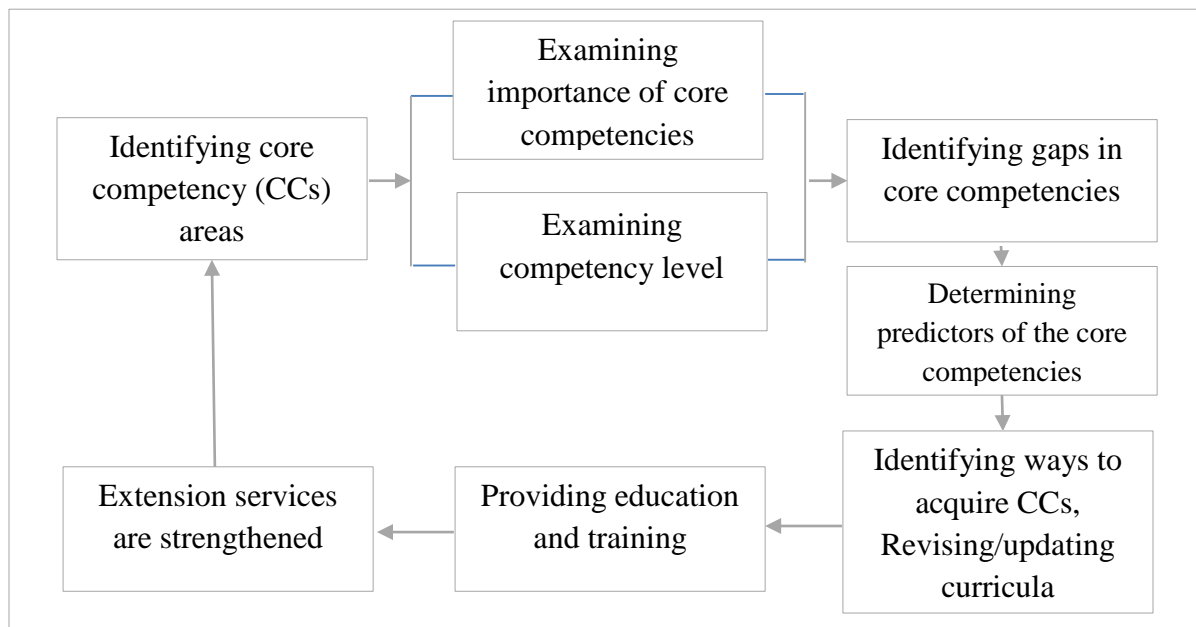


Figure 2: Conceptual framework

Competency-based human resource management is gaining ground in various service sectors, including extension services. The literature shows that most of the competency-based studies on extension have been conducted in the U.S., with a very few being based in Asia and Africa. Many developing countries, including Nepal, have yet to identify and examine their own competency needs for extension professionals. With no information on the core competencies of the extension human resources available, the second chapter focuses on identifying areas of agricultural extension professionals' core competencies.

The success of extension services depends greatly on the extension professionals' work performance. How do they perceive agricultural extension and related issues? How do they perceive individual and organizational needs? To what extent do they value extension core competencies? The answers to these questions have an impact on extension services. The third chapter discusses how extension professionals perceive the importance of core competencies.

Competencies can be developed through education and training. When conducted effectively, training and education can make individuals competitive and their services efficient. Therefore, it is imperative to assess training and educational needs among extension human resources. The fourth chapter examines the perceived level of competency of extension professionals and determines gaps, if any, between the perceived level of importance and their perceived level of competency.

Demand-driven extension is a priority agenda worldwide. The fourth paper assesses respondents' perceptions of their competency for demand-driven extension, and how they want to be trained and educated, which are crucial to extension.

The dissertation ends with a brief summary, conclusions and recommendations section. Presented in the conclusion section is an outline of a plan to attain demand-driven extension services highlighting its outputs, outcomes, impact, implementation strategy, and underlying assumptions.

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## **CHAPTER 2 CORE COMPETENCY NEEDS OF AGRICULTURAL EXTENSION PROFESSIONALS IN NEPAL**

### **ABSTRACT**

To provide the right education and training to prepare to address informational and educational needs of farmers, it is imperative first to know the core competencies required for extension professionals, which Nepal has yet to do. An exploratory study was conducted, using literature review and focus group discussions. Literatures reviewed included core competencies related documents used in eleven U.S. land-grant universities and other sources. Core competencies being used for extension educators were listed and those used by most universities were short-listed. Participating in the three focus group discussions conducted in May 2015 in Nepal were purposively selected 23 experts and entrepreneurs from agricultural education, extension, research, non-governmental organization, and the private sector. Focus groups were conducted using pre-approved discussion guide. Discussions were audiotaped and transcribed.

Transcriptions were read through, themes that emerged were coded using open, axial and selective coding generating ten core competencies. The core competencies list generated from literature review and focus groups were combined and consolidated resulting into eight core competencies. The findings reveal that Nepalese agricultural extension professionals require eight areas of core competencies, namely, program planning, program implementation, communication, program evaluation, education and information technology, personal and professional development, diversity and technical subject matter expertise.

*Keywords:* agricultural extension professionals, core competencies, core competency needs, Nepal

## 2.1 INTRODUCTION

The world population will reach 9.7 billion by 2050 and the world will need 60% more food than what we have today to feed that many people (Feed the Future, 2015). Given that many developing countries in Asia and Africa face low agricultural productivity one option to grow more food is to increase farm productivity by employing improved technologies and practices. Doing this will require effective provision of extension services by competent human resources—extension professionals.

Agricultural extension services are in need of revival. Calling for changes within the U.S. Extension System, the Extension Committee on Organization and Policy (ECOP; 2002) stated, “If extension is to thrive, it must understand and adjust to rapid changes and emerging challenges” (p. 2). Human capital—human resources that possess necessary skills, knowledge and attitudes—plays a key role in facing challenges and human capital is very important for extension services too (Cochran, 2009). Agricultural extension professionals play catalytic roles in agricultural development, so they are key assets and/or capital in extension services. To prepare extension professionals to work in changing contexts, it is important to determine the core competencies that will enable them to perform their work well.

Extension organizations in many developing countries have struggled to adapt to changing environments, which is mainly attributed to deteriorating extension human capital. Referring to agriculture-based developing countries, Vijayaragavan and Singh (1998) said that many of the agricultural extension departments of these countries “do not have a well-defined system of human resource management. Proper planning and management of human resources within extension organizations is essential to increase the capabilities, motivation, and overall effectiveness of extension personnel” (para. 2).

Since its inception in the early 19<sup>th</sup> century, extension services have continually evolved. In their recently published book on extension workers' core competencies, Suvedi and Kaplowitz (2016) described that the extension trajectory started with general extension, which refers to transfer of technology. Then decentralized project-driven (i.e., commodity-focused) extension was introduced followed by the participatory human resource development (i.e., a farming systems approach). The fourth approach posited by Suvedi and McNamara (2012) is the demand-driven, participatory, and pluralistic extension, which at present is gaining popularity because of it being beneficiary-driven and bottom-up.

Extension evolution has been shaped by the perceived goals of farming. Initially in the mid-1900s, when the world was facing severe food shortages, productivity increment was the sole goal of farming and efforts and input were focused in that direction. Technology transfer was believed to be the panacea for agricultural development. The technology transfer approach helped increase productivity in countries, which had human, physical, financial resources and where education and research supported the extension. Countries with limited resources could not adequately benefit from this approach as there were high administrative cost and technologies were not suitable to local socio-economic and agro-climatic conditions (Suvedi & Kaplowitz, 2016).

Commodity-focused approach targeted select commodities, e.g., sugarcane, cotton, rice, depending upon their growth potential and feasibility and extension funneled its input to those commodities. Weak linkages with research, education and private sector affected this approach (Suvedi & Kaplowitz, 2016). The farming system approach focused on working at community level to identify potentials and constraints of farming. Insufficient policy and institutional support were the hurdles facing the farming system approach (Suvedi & Kaplowitz, 2016).



It is obvious that, with the evolution in extension approaches, extension professionals' roles, responsibilities and competencies should change. Extension professionals have roles to play in all four approaches, but they are expected to involve beneficiaries and stakeholders more in the latter two approaches so that they are participatory and beneficiary-oriented.

Agricultural extension workers are now considered not only the channels for information transfer but also the facilitators, advisors, consultants, and sources for innovation and knowledge. To succeed in their work, extension professionals should know who their clientele is, work with their clientele to identify its needs, develop programs that the clientele demand; implement and evaluate programs, and at the same time, engage in co-learning with clients (Rajalahti, 2012). Farmers are the locus of agricultural development; their empowerment is crucial to agricultural growth; therefore, the extension philosophy should be “helping farmers to help themselves” (Terblanche, 2008, p. 64). Furthermore, to help farmers learn and succeed, extension professionals should understand the information and knowledge they share and be competent about the process they employ.

Competencies refer to the set of knowledge, skills, attitudes and behaviors that allow extension professionals to effectively perform their tasks as expected by their clients (Maddy et al., 2002). Identifying core competencies needed by agricultural extension professionals is crucial for planning their training and education programs. According to Vakola et al., (2007), “understanding and developing competencies of the organization and its employees are essential to having and maintaining a competitive advantage” (as cited in Benge et al., 2011, p. 2). Similar is the argument of Harder et al., (2010): “Organizations that identify the skills, knowledge, and abilities needed to achieve their goals, and work to develop those competencies in their employees through training and education, will achieve increased capacity” (p. 45). Chong et al.,

(2000) mentioned that it is essential that knowledge, skills, and abilities required in workers first should be articulated—this helps identify individuals who have the matching competencies for doing the work they are expected to do. Chong et al. added, “The necessary knowledge will enable individuals to apply the right skills for any work situation that may arise while having the right attitudes will motivate them to put in their best efforts” (Introduction, para. 2).

Even though identification of staff competency needs is within the realm of human resource management, we do not yet have a clear answer to the question “What core competencies do agricultural extension professionals (AEPs) require to perform their tasks well?” This question has been raised in several extension education and extension service studies (e.g., Davis et al., 2014; Gibson & Brown, 2003). The present study represents a step forward in determining the process skills needed by extension professionals in Nepal.

## **2.2 STUDY GOALS AND OBJECTIVES**

The goal of this study is to identify the core competencies required for agricultural extension professionals in Nepal. Its objectives are (1) to examine the core competencies used in cooperative extension services in the United States, (2) to determine the core competencies for extension professionals in Nepal as deemed important by education and extension experts, and (3) to generate a consolidated list of core competencies for agricultural extension professionals.

The study findings serve as the basis for designing a survey to be used in subsequent competency assessment studies. The findings will also help improve agricultural extension and training curricula while attuning training with the felt needs of the clients.

## **2.3 LITERATURE REVIEW**

### **2.3.1 Agricultural Extension Services in Nepal**

Agricultural extension in Nepal is primarily publicly-funded and provided. The two public organizations with networks to reach farmers with agricultural extension services are the Department of Agriculture (DOA) and the Department of Livestock Services (DLS). Some non-governmental organizations (NGOs) and private sector agencies such as agro-vets have also started providing extension services. A study in central Nepal shows that when government organizations (GOs) and non-governmental organizations (NGOs) work together there would be synergy in outcome (Ojha & Morin, 2001), but NGOs still have limited contribution and coverage compared with government extension services. Strong anecdotal information suggests that NGOs' often overlook the national agricultural programs and policies, and their staff members lack technical capabilities. The lack of empirical data on extension human resources means that Nepal faces difficulty harmonizing the services provided by these various service providers and thus augmenting agricultural growth.

Extension professionals are an integral part of extension services. Extension professionals in Nepal include office chiefs, subject matter specialists (SMSs) and technical officers working in district offices and service centers. Data are not readily available on the number of extension professionals in agriculture-based NGOs and the private sector. Given their limited network in the country, however, it seems plausible that the extension professionals' strength in NGOs and private sector is about one-fourth that of the GOs. Whether they are in GOs or other agencies, extension professionals are supposed to act as liaisons between research and farmers, and between departments (e.g., DOA, DLS) and farmers. They are expected to plan, implement and evaluate educational and informational programs and at the same time provide extension and

advisory services to the clients. Their being competent to plan and deliver extension services is vital to program success.

Begun in 1952, the agricultural extension services in Nepal have, over the past six decades, undergone many changes and adopted many different approaches and methods—individual-focused, group-focused, commodity-based, integrated rural development and pocket package. Agricultural growth and productivity in Nepal, however, have remained low for many years now, with little sign of improvement. This is mainly attributable to weakness in extension services and agricultural education and training (GON, 2015).

The agricultural extension services and agricultural programs in Nepal are task-focused, which means attaining input-output targets—for example, the number of demonstrations and trainings conducted, farmers’ tours organized and minikits distributed—dominate as the perceived goal of agricultural extension services (Suvedi & McNamara, 2012; Thapa, 2010). They seldom assess program outcomes and impact. The attributes of extension professionals such as—the process skills and/or competencies and knowledge, skills, behaviors and attitudes—, or whether extension professionals are competent to perform their given tasks are still unknown. Of Nepal’s 21 policies, 17 acts, 9 regulations, and 6 orders related to agricultural development—some of them directly related to extension services—none mention what competencies extension professionals need to implement these policies and acts or to even provide extension services.

Even though Nepal’s agricultural extension services are said to be transitioning to demand-driven, pluralistic and participatory forms, there is a mismatch between agricultural training and education and extension. This is captured in a statement from an FAO document

from Thapa (2010, p. 36): “Often the training has not been able to motivate extension workers for better performance; but at times yields frustration...”

Nepal’s agricultural extension services have not been effective at addressing the felt needs of diverse clients (Suvedi & McNamara, 2012). Nepal faces several problems such as limited adoption of improved technologies, low agricultural productivity and growing food trade deficit and increase in food insecurity for several years as a result (GON, 2015). The Annual Report of the National Planning Commission shows lower agricultural growth rates in Nepal the past few years (NPC, 2015). Nepal has realized and mentioned in its recently promulgated vision document for agricultural development—the Agricultural Development Strategy (ADS)—that overall development of agriculture remains slow and weak (GON, 2015). Realizing the shortfalls in the past agricultural programs and policies, the ADS has highlighted the urgency for a competitive workforce in the agricultural sector:

The ADS has consequently placed its core focus on competitiveness. Competitiveness is founded on: a competent, hard-working and efficient work force; a clear understanding of what makes Nepal unique in the global market place; and, the determination and entrepreneurship to maximize productivity and innovate with new products and processes based on the country’s natural endowments. (GON, 2015, p. 7)

As alluded above, the Department of Agriculture (DOA) and the Department of Livestock Services (DLS) under the Ministry of Agricultural Development are the two departments offering extension services and responsible to implement the ADS. The above quote in ADS refers to DOA and DLS human resources, which warrant a thorough study of Nepal’s extension services, including competencies of agricultural extension professionals.

### **2.3.2 Competencies Studies**

There is ample literature about core competencies of extension professionals in the Cooperative Extension Services in the United States. According to Liles and Mustian (2004),

after Gibson and Hillison (1994) developed nine core competencies, the Blue Ribbon Commission (BRC) in 1999 developed core competencies for North Carolina Cooperative Extension professionals. Employing a pretested survey, Gibson and Hillison (1994) sought North Carolina Extension professionals' perceptions of importance of and training need for extension competencies. The competencies the Blue Ribbon Commission developed are community and social action processes, diversity/pluralism/multiculturalism, educational programming, engagement, information and education delivery, interpersonal relations, knowledge of organization, leadership, organizational management and professionalism. Liles and Mustian updated the core competency list to include knowledge of the extension organization, expertise on technical subject matter, program planning and implementation ability, drive to attain professionalism, effective communication, ability to interact successfully with diverse individuals and groups, and leadership ability.

Employing the group-administered survey among Arkansas extension agents involved in the program areas of agriculture, family and consumer sciences, 4-H, and community development, Cooper and Graham (2001) identified the competencies required for county extension agents and supervisors in Arkansas. Competencies they identified are program planning, implementation, and evaluation; public relations; personal and professional development; faculty/staff relations; personal skills; management responsibility; and work habits.

Stone and Coppernoll (2004) described elements of the competency-based professional development system, which they called You, Extension, and Success (YES). For extension professionals to succeed at their jobs, they pointed to six broad categories of core competencies—subject matter expertise, organizational effectiveness, developing and involving others, communication, action orientation and personal effectiveness. They also suggested that

essential skills for employees include communication and information, professional development, planning, learning opportunities and resources, integration and accountability.

Using the Four Stages of Professional Careers Model, Bengtson et al. (2011) examined the necessary pre-entry competencies for Florida extension agents. The most necessary competencies for extension agents, according to Bengtson and colleagues, are “self-management, program development process, communication skills, interpersonal skills, technical/subject skills” (p. 1).

Using mixed methods, Scheer et al. (2011) compared and contrasted the academic extension education model with the extension human resource management model. The academic extension model is about educators working in colleges and universities who teach extension education whereas extension human resource management model is about field extension workers. They found 19 competencies of the first model (i.e., academic extension) similar across 22 competencies of the second model (i.e., extension human resources); however, an additional seven competencies were unique to the second model, the human resource management model. The seven core competencies are as follows: knowledge of extension, flexibility and change, understanding stakeholders and communities, management and supervision, marketing, continuous learning, and customer service. The study shows that there are similarities between core competencies of extension educators who teach extension education courses in academia and extension agents who work as extension providers in the field, and that it is worth determining those competencies.

Seeking input from extension experts, Harder et al. (2010) generated 19 core competencies required by entry-level extension professionals in the United States. They recommended an extension program development process with six competencies, core

interpersonal skills with nine competencies and an additional four core competencies essential for extension professionals. Their study did not, however, look at the core competency needs of the extension professionals who were already working. In the same line, Culp et al. (2007) identified 32 core competencies required by 4-H volunteers in Cooperative Extension Services in 12 states in the United States. These scholars emphasized that extension management should redefine and identify the core competencies of extension staff.

Employing a phenomenological method, Varner (2011) studied the competency needs of millennial generation extension educators. Varner explained that, as the world is heading toward a new era, the worldviews of extension professionals are changing. Extension professionals in the new era demand more freedom in their work and decision making. They want to make meaningful contributions to their profession, for which they perceive the need for yet higher levels of skills, knowledge, and abilities. On the flip side, Varner, in summarizing the findings mentioned that having come across several challenges, extension educators feel confused and overwhelmed, and they are in need of support and additional knowledge and skills. He concluded that there is a need for further discourse and study on the competencies that extension professionals need to possess in order to succeed.

Several U.S. land-grant universities have identified competencies for their extension professionals. For example, the Michigan State University Extension (MSUE) Organizational Development webpage lists 10 core competencies required for its extension educators (MSUE, 2015). Each core competency contains sub-competencies and their indicators. Resources to learn core competencies and tools to self-assess the competencies are provided on the MSUE webpage. The literature shows a few core competency-related studies based in Pakistan, Nigeria,



Malaysia, Oman, Bhutan, Ethiopia and Iran. These studies appear to be in agreement that core competencies are integral parts of extension professionals.

Presenting the concept of integrated professionalism, Mulder (2007; 2014) argued that a combination of knowledge, skills, and attitudes lead to competency, and that they are the important traits that extension workers should possess. However, the need for competencies among extension workers is context-specific (Mulder, 2014), and extension education is a lifelong learning process (ECOP, 2002). Hence, these core competencies are subject to change as new situations unfold.

Most core competency-related studies in agricultural extension and education are from the West, particularly the United States. A few studies undertaken in Asia and Africa have referred to and/or used the U.S.-based core competencies as the basis for their studies. To my knowledge, based on the literature review, none of the studies in the East, before conducting actual surveys, sought out experts' and/or stakeholders' perspectives to generate a core competency list. This observation leads to some propositions. First, it would seem highly likely that the competencies that stakeholders considered important might have been left off these surveys. Second, it is imperative to identify the core competencies that *today's* extension professionals need. Indeed, contexts have changed since these studies were conducted. For example, technologies have advanced, farmers have new needs and problems, and workers need new skills to address them. A problem agricultural extension services face is not knowing the competencies that agricultural extension professionals require to perform well their tasks.

## **2.4 STUDY METHODS**

The methods of this study were the literature review followed by focus group discussions. The former explored the development and evolution of core competencies in the U.S. contexts

and the latter helped to find out expert's perspectives of the core competencies required for agricultural extension professionals in Nepal. This is an exploratory and inductive study.

For the purpose of this study, “agricultural extension services” (AES) refers to extension and advisory services such as education, training, demonstrations and social mobilization, as well as consultancy services provided by agricultural extension professionals and their organizations to farmers and other agricultural stakeholders. Agricultural extension services aim to educate and inform farmers of new and/or improved technologies, products, services, and practices; motivate them to adopt innovations; and help improve agricultural production and productivity. Extension professionals (EPs) are the officers-in-charge, the subject matter specialists (SMSs) and technical officers (TOs) at the District Agricultural Development Office (DADO) and District Livestock Services Office (DLSO), and the program officers at non-governmental organizations (NGOs) who plan, implement, monitor, and evaluate agricultural and livestock extension programs in their respective offices and command areas.

#### **2.4.1 Objective 1**

For objective 1, the study method was the review of literature on competencies. In the current era of globalization, it is common to have knowledge and information sharing among academics and other professionals across the globe. This study, in particular, reviews the U.S.-based studies and uses them to draw a tentative list of core competencies required for extension professionals. Educational institutions are rich sources of competency-related studies and programs. Information provided by organizations and individuals who created it are more reliable than information gathered elsewhere. Also, as alluded to by Creswell (1994), data such as written and saved documents could provide valuable information from an author's own words or languages and offer important clues about how issues under study have been evolving.

The United States has done the most competency studies, and U.S.-developed tools and/or indicators have commonly been used for research and academic purposes globally. U.S. colleges and universities have institutionalized core competencies in their cooperative agricultural extension system. Researchers outside the United States often refer to the U.S.-developed core competencies. Recently, Dai (2014) used U.S.-developed online education indicators to study the Chinese online education system, and he found most of those indicators relevant to the Chinese context.

The MSU Library webpage, Google Scholar and ProQuest were searched for publications related to core competencies for agricultural extension professionals. Relevant publications and Ph.D. dissertations were also reviewed. The core competencies for extension professionals being used by several U.S. universities (University of Nebraska-Lincoln, The Ohio State University, Michigan State University, North Carolina State University, Washington State University, Kansas State University, Iowa State University, Oklahoma State University, University of Missouri, Texas A & M, and University of Florida) were read. A few other universities—for example, the University of Arizona—have core competencies mentioned, but they are more specific and focus on a particular competency (e.g., professional development), or they have adopted the same core competencies as used by other U.S. universities; and some have not listed their core competencies yet. Therefore, these universities are not included in the list.

The core competencies for U. S. extension professionals as reported by U.S. universities and other sources in the U.S. are first listed (Table 2.3 in Appendix A). Then those core competencies recommended and/or used by more than four U.S. Universities are selected (Table 2.4 in Appendix A). Previous studies on education and extension, including Dai (2014) and Scheer et al. (2011), have employed similar procedure and found it to be effective.

### **2.4.2 Objective 2**

For objective 2, the focus group discussion (FGD) with extension experts was the study method. Focus group discussions have been widely used in exploratory research. I chose to use focus group discussions for this study for the following reasons. First, they foster in-depth and focused discussion on research issues among group members. According to Kaplowitz and Hoehn (2001), focus group discussions generate more data than individual interviews. The focus group generates rich data that would be difficult to obtain from surveys, interviews and other quantitative methods. Kamberelis and Dimitriadis (2005) write that focus groups “allowed researchers to explore the nature and effects of ongoing social discourse in ways that are not possible through individual interviews or observations” (p. 902). They add that focus groups are particularly effective in capturing the “critical interactional dynamics that constitute much of social practice and collective meaning making” (p. 902).

Second, focus group discussion can be used as a primary and/or a secondary research tool, in planning and goal setting, in needs assessment and in scoping studies (Kaplowitz et al., 2004; Krueger & Casey, 2009; Morgan, 1997). Focus group discussions are dynamic and can sometimes produce unpredicted information. According to Morgan and Fellows (2008), as an exploratory qualitative research tool, focus group discussion can help design surveys in three ways: by revealing the fundamental content to be addressed in the research topic; in cases where content is already known, by helping narrow down research questions; and when contents are known, by helping define words or terminologies. Another advantage is that discussion of a common topic among focus group members generates data as they are generated in ordinary and/or natural discussion. Several past studies have used focus group discussions on core competency studies and found it to be useful (Harder et al., 2010; Liles & Mustian, 2004; Stone

& Coppernoll, 2004). Local Initiatives for Biodiversity, Research and Development has used FGDs in agricultural research in Nepal and found them useful (Reed et al., 2014).

#### **2.4.2.1 Discussion guide**

A discussion guide was used to direct the focus group discussion (Appendix D). Expert advice was sought to finalize the questions. Questions for the discussion guide were sequenced in an order suggested by Krueger and Casey (2009): opening question, introductory and transition questions, key question and closing question.

#### **2.4.2.2 Research ethics**

Focus group discussions were tape-recorded. Participants filled out the consent form (Appendix C) before taking part in the discussion. The moderator explained the definition of the term “core competency” before asking the key question. Confidentiality of the data and anonymity of the participants’ identity were maintained throughout.

#### **2.4.2.3 Preparing for the focus group meeting**

The meeting venues were cozy rooms in centrally located hotels. The moderator observed and chose the venues two weeks ahead of the meeting day. The moderator and assistant moderator visited the meeting venue a day prior to the meeting to ensure that meeting materials—flip charts, markers, flip chart board and attendance sheet—were ready and in the right place and in the right number. They also checked the power supply to the room, tested the voice recorder, and made sure the air conditioner worked and the meeting room had adequate space to accommodate meeting participants. They arranged tables and chairs in such a way that every participant could see and hear every other participant.

#### **2.4.2.4 Participant selection**

Seeking experts' advice is important to review and refine ideas and proposals in competency assessment and in curriculum assessment and development (Dai, 2014; Karbasioun et al., 2007) because experts have rich research as well as academic experience in their field of expertise that can help them foresee challenges and opportunities. They provide pragmatic input, and people value their input to address societal issues; therefore, their opinions are important. Specifically, host country experts will be able to judge the skills, knowledge and abilities that local staff members such as extension workers need and choose staff core competencies.

The study population comprises experts from agricultural extension and education representing agricultural universities, the agricultural research council, public agricultural extension organizations, non-governmental organizations (NGOs) and the private sector. Institutions they represent included the Department of Agriculture (DOA), the Department of Livestock (DLS), Agricultural and Forestry University, Tribhuvan University and Purbanchal University, the Nepal Agricultural Research Council, the Council for Technical Education and Vocational Training (CTEVT), and the private sector.

With suggestions from the director generals of the DOA and DLS and senior extension experts in Nepal, first, a pool of about 50 experts, from the population described above, was generated. Then from that pool, the purposive selection (Patton, 2002) of 39 experts followed, with 13 members in each group. Participants were invited two weeks prior to the date of the meetings (see Appendix B for invitation letter). They were also contacted by telephone, requested to participate in the meeting, and reminded a day prior to the meeting through both email and phone about the meeting, time and venue. Twenty-three people attended the meetings—four in the first, eight in the second, and 11 in the third meeting. In each case, the

number of participants was within the accepted range of four to 12 persons per focus group (Kaplowitz & Hoehn, 2001; Krueger & Casey, 2009).

#### **2.4.2.5 Variable of interest**

Terms, phrases and/or messages pertaining to core competency of extension professional participants shared during focus group discussion were the data and variables of interest.

#### **2.4.2.6 Data collection**

The moderator welcomed the participants, explained the objectives of the meeting, and informed participants of the ground rules of the meeting. Participants introduced themselves, sharing their names, organizations and experience in agricultural extension services. These introductory and ice-breaking exercises are necessary to overcome hesitation by participants to participate in discussion (Kaplowitz & Hoehn, 2001), especially of controversial issues. Once they become accustomed to the group environment, they will be more open and will start revealing new information.

The assistant moderator took the notes. The moderator also took notes highlighting the major points of the meeting, which he shared with participants while wrapping up the session. Meetings lasted for about two hours. Moderator and assistant moderator sat together after the focus group discussions, reviewed the discussion process and shared their notes to ensure all important comments were captured.

#### **2.4.2.7 Data analysis**

Focus group interviews were transcribed and subsequently coded using open coding, axial coding and selective coding techniques, as suggested by Neuman (1997) and Peterson (2000) and as used by Kaplowitz (2001). The researcher read the texts, identified the themes, and allocated codes or labels to the themes. The themes were examined to find out whether any

relationships existed between and among them, and whether they could be grouped together. The frequency with which themes were mentioned was recorded and reported in the findings. The findings of the three focus groups were combined to generate a core competency list. Krueger and Casey (2009) underscore that frequency, specificity, emotion and extensiveness of themes should be given due consideration during focus group data analysis. Accordingly, the opinions and/or themes that stood out were described and quoted wherever appropriate. To ensure anonymity of participants and to help trace who said what, focus group participants are given different codes. First digit that follows the word “Participant” indicates the focus group number and the second digit after the period is the participant number. For example, the first participant of first focus group held on May 25, 2015 had Participant 1.1 code; second participant had Participant 1.2 and so on. The first participant of the second focus group held on May 26, 2015 is given code Participant 2.1, second participant as Participant 2.2, first participant of third focus group held on May 29, 2015 given coded as Participant 3.1 and so on.

### **2.4.3 Objective 3**

Objective three sought to prepare the consolidated core competency list. The core competency list obtained from focus groups and those from the literature were compared and integrated, and redundant core competencies were removed to generate the final list of core competencies. Following a similar method, Scheer et al. (2011) compared competencies of extension education and extension human resources and drew a final list of competencies for Ohio State extension professionals.



## 2.5 RESULTS AND DISCUSSION

### 2.5.1 Objective 1. To examine core competencies used in U.S. cooperative extension services.

There are 98 competencies and core competencies listed in eleven U.S. studies or sources. The final list, after discounting those competencies that were redundant, had 34 competencies (see Table 2.1 for top 11 competencies and Table 2.4 in Appendix A for the whole list).

Table 2.1 Top eleven competencies used in the U.S.

Competency	1	2	3	4	5	6	7	8	9	10	11	Total #
Communication skills	Y	Y	Y	Y	Y		Y	Y	Y	Y		9
Professionalism	Y	Y	Y	Y	Y			Y			Y	7
Technical subject matter expertise			Y	Y			Y		Y	Y	Y	6
Knowledge of organization/organizational management						Y	Y	Y	Y	Y	Y	6
Program planning	Y					Y	Y		Y		Y	5
Educational and information technology	Y					Y		Y	Y		Y	5
Interpersonal relationship		Y		Y	Y	Y					Y	5
Diversity and pluralism	Y	Y			Y	Y						4
Facilitative leadership	Y					Y	Y	Y				4
Program implementation	Y						Y	Y		Y		4
Evaluation and applied research	Y						Y		Y		Y	4

Communication skills is the most sought after core competencies, which nine out of eleven sources reported. Professionalism is mentioned in seven sources; followed by technical subject matter expertise and knowledge of organization/organizational management in six sources each; and program planning, education and informational technology facilitative

leadership and international relationship in five; and, diversity and pluralism, facilitative leadership, program implementation and evaluation and applied research reported in four sources each. Four additional competencies were reported in three sources each, five competencies in two sources and 14 competencies in one source.

The later 24 competencies were further examined to see whether they had common themes and therefore could be grouped together. Five competencies—flexible/adaptable, self-directed, inclusive, personal effectiveness and continuous learning—were found to be very close to the core competency professionalism. Resource utilization is included under program implementation. The rest—fostering teamwork, resolving conflict, identifying sociocultural groups in the community and develop and involve others—are kept under leadership.

The above results show that communication skills are one of the most important traits for U.S. extension professionals, and possibly in many other developed and developing countries as well. Communication is the crux of the extension. Effective communicators such as extension workers do not only deliver information in an understandable and convincing way, but persuade beneficiaries to share their perceptions and/or and problems of farming. On a similar note, professionalism is about following and/or practicing norms and standards set forth by professional organizations to serve clientele to the best possible way and attain professional goodwill. Professionalism is one of the essential traits private providers give due importance.

Closely following communication skills and professionalism are technical subject matter expertise and organizational management skills, which six of the eleven sources mentioned. Many developed countries such as U.S. are leading on technological advancement and thus the production and productivity. Beneficiaries such as farmers are also educated, have access to and are informed of the current research and technologies. Thus this researcher had the belief that

technical subject should not be a priority agenda and competency among extension educators. On the contrary, most universities still see technical subject matter expertise as one of the most important competencies extension educators should possess. The review suggests that technical subject matters remain to be important and critical to extension irrespective of the degree of the development in agriculture.

Organizational management too is included in six sources indicating yet another critically important competency for extension educators followed by program planning and educational informational in five each. It shows that the U.S. Cooperative extension services seek its extension workers to be competent in social media, email, the Internet, and computer use. Given that 21<sup>st</sup> century is an era of information and communication technologies (ICTs) and ICTs' importance is ever increasing, the above findings imply that the U.S. Cooperative extension services is striving to keep its extension workers competent and compatible to work in changing contexts. The findings are compatible with other studies outside the U.S. (Namdar et al., 2010; Terblanche, 2008).

Other competencies: Critical thinking, successful teaching, knowledge of marketing and knowledge of extension are other competencies that the review revealed. Among these four, “knowledge of extension” is particularly critical for extension workers because, unless and until extension workers know the principles and usages of extension, they may not be able to articulate the needs of their clients and effectively implement programs to meet them, and the whole of extension services may be endangered. Extension professionals should understand what extension is, how it has evolved, and what its missions and programs are (Washington State University, 2015); therefore, the competency “knowledge of extension” is very relevant for extension professionals.

Even though the above-mentioned core competency list is not exhaustive, the findings are important to understanding the competencies that today's extension professionals should possess and be ready for, and the areas that extension education services and extension human resources should focus on.

## **2.5.2 Objective 2. Determine the core competencies for extension professionals in Nepal as deemed appropriate by extension and education experts.**

The second objective sought to determine core competencies for extension professionals in Nepal as deemed important by education and extension experts. This section begins with describing what participants perceived agricultural extension services are to them and findings and discussion on core competency needs follow.

### **2.5.2.1 What does “agricultural extension services” mean to extension experts?**

Participants came up with various themes defining agricultural extension services. In so doing they also shared pertinent problems and/or issues facing agricultural extension services and proposed solutions to address those problems. The majority of the respondents mentioned that agricultural extension services are about dissemination of new agricultural technology to farmers; agricultural extension services are related to rural people; agricultural extension services are about extension workers visiting farmers, extension workers making their hands dirty, farmers and extension workers working together and engaging in co-learning. These points indicate that experts want changes in the worldviews and behaviors of extension workers.

Participants underscored that agricultural extension services are not only about agriculture—it plays multiple roles and has multiple meanings. Traditionally, agricultural extension services meant educating farmers to adopt innovations, but it is no longer a one-way process. It is not only farmers who learn in extension services. Extension professionals can also learn from farmers. Extension professionals may have knowledge on modern technologies, but

farmers have reservoirs of experience and knowledge that have been time-tested and/or accumulated from their experience. Highlighting co-learning between farmers and extension workers as the meaning of agricultural extension services, one participant said:

Extension is transfer of technology to farmers. But farmers also have...tremendous knowledge, and extension is not only the transfer of technology to the farmers, but working with farmers is also extension. They [farmers] have tremendous knowledge and technology. They have been practicing very good knowledge and we can learn together. Learning with farmers is also extension. [Participant 3.4]

Participants tended to perceive extension services as services provided solely by the Department of Agriculture (DOA). Views such as linkage between research, extension and education; extension as the bridge between them; and extension as non-formal education also came up. One participant stated, “Extension is not only about agriculture and livestock, it should cover other sectors as well.” Though the participant did not elaborate what other sector he/she was referring to, but he/she hinted that extension should go beyond its traditional mandate of technology transfer.

Participants mentioned several problems and negativities of the current extension services and also proposed solutions to address those issues while they explained the meaning of agricultural extension services. No newness in agricultural extension services (or rhetorical services) and the lack of agricultural information programs for commercial farmers were raised. Given that agricultural extension services in many developing countries is still dominantly publicly-funded and large numbers of smallholders lack access to extension services, the suggestions to serve commercial farmers should not be an issue.

The culmination of the discussion of the first question was a markedly different view put forth by a participant District Agricultural Development Office (DADO) chief [Participant 3.4]. He stated, “Agricultural Extension Services (AES) is not only transfer of technology (TOT), it is

also about social spirit, motivation and establishing trust among [with] farmers.” This statement highlights extension professionals should first understand their clients and build rapport with them, and then gradually proceed with implementing extension programs. Referring to reciprocity in services between farmers and agents, another participant mentioned that, if extension professionals behave with farmers properly, farmers will reciprocate and accept them in their communities.

### **2.5.2.2 What core competencies do extension professionals need?**

Participants were asked what knowledge, skills, abilities and behaviors or core competencies they would like to see in extension professionals for them to do their jobs well. There were altogether 69 competencies mentioned by participants. Further analysis such as integration and/or grouping of the related competencies generated ten core competencies (Table 2.2), which are described below.

Table 2.2 Core competencies suggested by focus group participants

Core competency	Examples
Program planning	Familiar with national agricultural policies, programs and strategies; involve clients and stakeholders in needs assessment; effectively mobilize resources including local resources (e.g., resource persons)
Program implementation	Familiar with government and/or local administrative rules and regulations; understand and follow working procedures
Resource mobilization	Tap resources; allocate resources to the needy ones; collaborate with line agencies such as NGOs to avoid duplication in programs and make efficient use of available resources
Technical knowledge	Basic knowledge of technical subjects of their discipline; safe use of pesticides; knowledge of their subject matter; remain current with the new innovation and research; able to conduct integrated pest management (IPM)
Coordinating skills	Capacity to coordinate various stakeholders including local political bodies and line agencies; NGO professionals should coordinate with DADOs and DLSOs

Table 2.2 (cont'd)

Professionalism	Respect time; follow work ethics; maintain transparency in work; be motivated and positive about extension work; diligent; proactive to understand and solve problems
Extension research linkages	Eager and skillful to work with farmers; possess research skills; engage in applied research; document the work and share the results with stakeholders; assess outcomes of research and inform research with the findings
Communication skills	Understand and take into account social, cultural, economic, educational contexts of the clients; effective trainer; effectively listen to clients; good speaking skills
Leadership, managerial skills	Facilitator; demonstrate administrative skills; effectively manage office and staff members
Information and communication technologies (ICTs)	Computer and e-extension friendly; use the Internet for learning; communicate through emails with clients and stakeholders when needed

### 2.5.2.3 Program planning

Program planning is an important part of extension. All of the focus group participants felt that extension professionals have to be competent in program planning. As program planners, extension professionals have to be cognizant of national policies, strategies, programs, rules and regulations so that programs follow existing norms and contribute toward achieving national goals. All program participants agreed on this. Previous studies have shown program planning to be an important competency that extension professionals require (Scheer et al., 2006; Stone & Coppernoll, 2004). Extension professionals should follow the program planning cycle that starts with the situation analysis and ends with review. Based on the lesson learned, the planning for next phase commences.

### 2.5.2.4 Program implementation

Participants mentioned being able to successfully implement extension program as one of the important competencies extension professionals should have. Participant 3.3 describes that

“There are several working procedures [standard of practices]. It is difficult to read them all. [But] there are several programs and we need to know all the working procedures in order to keep track of work. If not, there will be [that will be considered] misappropriation of public fund.” He elaborated that related to working procedures are the demand analysis, expenditure analysis, giving the work order, contracting out the program, monitoring and evaluating the works are other activities extension professionals have to be familiar with.

#### **2.5.2.5 Resource mobilization**

Participants strongly and repeatedly voiced that extension professionals should be competent in resource management and/or mobilization. Given that resources for extension services are limited and shrinking, extension workers have to be skillful to tap resources of various types—human, physical, social, financial—from different sources—public, private—and allocate those resources to achieve the most impact on those with the greatest need. Reflecting upon his experience of working with a limited budget, one participant said, “We have a limited resource and we have to cover a large population...it [there] is not more than 20 to 25% [of the] coverage in services by DADO and DLSO offices” [Participant 1.3].

The DLSO and DADO chiefs are in charge of mobilizing resources in the districts; therefore, “They must have managerial skills and capabilities to manage resources” [Participant 1.1]. Another participant mentioned that extension programs are now devolved to the districts. The chiefs lead the planning activities in their respective districts, and they should be competent and confident in their work.

Trained and/or educated professionals are potential human resources (human capital) that organizations can mobilize to improve their efficiency. Organizations have to provide conducive working as well as learning environments so that their human resources continually learn,



innovate and contribute to organizational efficiency. Illeris (2004) refers these processes as learning processes that comprise of “organizational learning” and “learning organization” (as cited in Merriam et al., 2007). Merriam et al. add that the organizational learning refers to experience-based individual or collective learning that helps organizations succeed. Learning organization is about organizations encouraging its staff members at all levels of organization to engage in interaction, dialogue and action and be innovative. These two phrases imply that society is changing and competitiveness is increasing in every sector. To succeed in their extension endeavors and sustain the outcomes, it is imperative that extension workers continuously learn. It appears that there is neither a mechanism to identify and use extension workers’ expertise nor conducive learning environment in Nepal.

In spite of the general agreement that resources for agricultural extension services are limited and getting scarcer, it was surprisingly pleasant to know from a participant that, in Nepal, resources for public agricultural programs in recent years have increased significantly. What is needed now are competent professionals who can best utilize those resources. One participant stated:

There is an extremely huge resource [for agricultural programs] now... They [staff members] are overloaded with the programs. [However] Knowledge update is rare; it is not happening at all... They [extension professionals] are so busy in programs like training...they themselves need training...When they provide training, they teach basic [same old] things that they have learned [long ago] during their study period [Participant 2.1].

#### **2.5.2.6 Technical knowledge**

Technical knowledge is another most mentioned core competency by participants. Updated technical knowledge; knowledge of new seeds, breeds, pesticides; and ability to conduct Integrated Pest Management (IPM), among others, are included in this core competency. Use of improved technology to improve agricultural production and productivity is paramount to Nepal,

given the low productivity for most crops and vegetables, the decrease in balance of cereals and other foods, and the increase in imports of these commodities (GON, 2015). As a participant said:

And of course technical knowledge is very important. Even though a subject matter specialist cannot be [an] expert in all the technical areas... he should have at least basic knowledge of [his discipline] [Participant 1.1].

Referring to subject matter specialists (SMSs), one participant explained that they provide consultancy services to the clients. He stated that it is important that extension workers have technical knowledge and remain current in their field, but currently field workers do not have adequate technical knowledge or skills to cater to the need of the commercial farmers [Participant 1.1]. Supporting this point, another participant said that the SMSs should have up-to-date knowledge of their discipline or field, without which it will be difficult for them to work [Participant 3.11].

One participant [Participant 2.1] mentioned that farmers attend trainings with the hope that they will learn something new and useful to their farming, but they often get frustrated because trainers use the same old class notes and participants acquire no new knowledge or skills. Trainers neither search for new literature nor have any interest in learning new things.

Referring to the commercial farmers and highlighting the need for technically competent extension staff members, one participant mentioned that farming in Nepal is changing, with more commercial farmers coming up who are investing in agriculture and agribusinesses. They expect better returns from their businesses. He went on to explain that:

They [commercial farmers] are educated. They use Internet facilities. They can access information....What I have found rather is that these commercial farmers are more advanced than subject matter specialists. Because they have invested their resources in their businesses....So they get information from all the possible sources while extension

officers in the district...are sort of bureaucrats, not even technocrats.... Their technical knowledge is not updated. [Participant 1.1]

Additionally, the Participant 1.1 shared an interesting perspective about extension workers who are not as competent technically as they should be. He added that when extension workers are not competent and are not able to help farmers with advice, they try to avoid the farmers. This demotivates staff members and it does not help farmers, either.

Except in a few sectors—such as poultry, where private services surpass the public services (Suvedi & McNamara, 2012)—most agricultural sectors in Nepal still rely on public extension services. Participants did not categorically tell which services they expected extension professionals to provide to commercial farmers. Given that private providers do not see services such as regulatory and laboratory services as profitable and do not provide them (Rivera & Qamar, 2003), public organizations provide these services. Commercial farmers may also be willing to pay for services if extension services provide services that are reliable.

The above findings indicate that technical subject matter expertise is still getting increased attention and importance in Nepal. Reasons for this could be the high gap in expected and current agricultural productivity; as mentioned by several participants; there is dearth of technically competent workers and thus a knowledge gap and low agricultural productivity. Another reason could be respondent biases. All of the participants were trained in traditional schools, and their technology-focused worldviews might have influenced their answers. This needs further inquiry.

#### **2.5.2.7 Coordinating skills**

Coordinating skills is another most mentioned competency, mainly for non-governmental professionals. The pluralistic approach of extension envisages non-governmental organizations

to be partners in extension service delivery (Swanson & Sammy, 2002). NGOs, however, are criticized for serving the elite and not reaching the people who need services the most. Thus, coordination among service providers is extremely important.

The DOA and the DLS and their district offices—DADO and DLSO—have been providing extension services in Nepal for four decades or more. Agriculture-based NGOs are relatively few and new to extension services in Nepal. Some studies claim that most NGOs are donor-driven and are not bound by government rules (Dhakal, 2007; Birner & Anderson, 2007); therefore, their programs may not represent the national policies. The suggestion to have coordinating skills as one of the core competencies among agricultural extension professionals looks timely, but this suggestion equally applies to government organization (GO) professionals because they play roles in coordinating with line agencies on program planning and implementation, including resource mobilization. The following quotes from the participants are self-illustrative.

NGOs and INGOs [International Non-Governmental Organizations] are guided by their own rules and they work accordingly. They should know government [national] policies and programs. They should coordinate with the government agencies. Because after all, government [offices] at the district level are the permanent bodies. INGOs may stop or withdraw their programs [any time], but DLSO, [and] DADO remain there forever. They will continue [to remain in the future]. [Therefore] There should be coordination...[Participant 1.1].

Coordination is not only about GOs and NGOs working together. Coordination could be for resource tapping and resource mapping. One participant stated:

They [NGOs] [may] need foundation seed. If they have to take [buy livestock] breeding stock that only government farms can provide. There are no NGOs or INGOs who work for this [breeding stock]...[Therefore] they have to work with the government sector [Participant 2.2].

Sharing an experience from one of her research projects, the Participant 3.8 said that because of negligence in participant selection, some farmers are receiving the same training time and again while who most need the training are not invited. This is a misuse of the resources that coordination would avoid.

Besides working as extension advisors, the DLSO and DADO chiefs have to work on organizational management, including staff management. Participants perceived that there are several other roles and qualities that people expect from district chiefs.

DADO and DLSO chiefs as the managers have to coordinate among and between many agencies. Government and non-governmental bodies, they have to pool resources, etc.... so coordination is also important...and proper utilization of resources. Mainly agricultural, veterinary or livestock graduates are technicians [technocrats] and they do not know much about financial rules, administrative rules and managerial skills, which is [are] also needed [Participant 1.1].

Importantly, NGOs and GOs people can serve as resource persons for one another. This has several advantages: enhanced coordination, knowledge sharing, and better program implementation, better results and sustainable programs. As one participant said:

NGO itself could be the resource persons for DLSO and DADO. Those who follow [and] coordination [their] program...would sustain. Sustainability is the key factor. Ultimately program has to be sustained. Tomorrow when NGOs leave [it is GOs who should take care or carry over] [Participant 2.6].

Unlike most participants, who presented negative sides of the NGOs, one participant said that there are very good NGOs, too, in the agricultural sector, and there are NGOs in which staff members are more accountable toward their clients than GO staff members. Presenting an example of GO and NGO collaboration, the Participant 2.1 said that the Tuki Sangh, an NGO, has been effectively working to deliver services in rural Dolakha district and its people visit GO offices for advice when needed. The above points reiterate the fact that coordination is a key for

success, and staff members such as extension professionals who are in charge of extension services should be able to play effective coordinating roles as and when needed.

#### **2.5.2.8 Professionalism**

Participants suggested “professionalism” as yet another core competency needed by extension professionals. Professionalism refers to standard of practices, including skills and competencies, expected and required of the respective profession. The competencies related to professionalism that came up during discussion included self-management, positive attitude, motivation, transparency and respectful to others. Good governance practices, integrity and inclusiveness are other competencies leading to professionalism in extension professionals. A criticism facing extension services in developing countries, including Nepal, is that extension professionals are accountable to their bosses higher up in the bureaucracy and not to the farmers they serve, they lack transparency, and the overall quality of their work is poor (Thapa, 2010).

Motivation is vital for success; however, “People [extension workers] do not have that much motivation to work as a competent worker,” one participant [Participant 1.3] said. He added that extension workers have to work in remote corners of the country where transportation is lacking and basic services and facilities are limited. Supporting this stand, another participant [Participant 1.4] said that extension workers who work in remote regions might easily get frustrated because they have to work in harsh field conditions. Baig and Aldosari (2013) report similar situations in other Asian countries. In their analytical paper on Asian extension services, Baig and Aldosari mentioned that extension staff members are demotivated because they have low social status, get few incentives and have very low opportunity for career advancement. Staff members’ attitudes are positively related to their motivation to work [Participant 1.1]. But there

is dearth of motivated staff members with positive attitudes in Nepal (Thapa, 2010). Therefore, motivation and a positive attitude are essential competencies for extension professionals.

Extension professionals are required to visit farmers, work with farmers while demonstrating new technology, get their hands dirty and learn from their experiences. Emphasizing the need for extension professionals to follow “learning by doing,” one participant said that if our extension professionals get their hands dirty and offer field tested technology and practices to the farmers, then extension would be successful. Another participant added that extension professionals have to visit the field to see and learn the real situations, which often are different from what they find and/or are taught in colleges or offices. He continued that several factors—political, economic, educational and cultural—affect their work with clients. Extension professionals have to learn to accustom and work in these diverse conditions (Baig & Aldosari, 2013). But, how?

The Participant 3.2 representing a private industry mentioned that the government extension professionals project themselves as superior persons to their service seekers, but they are reluctant to update their knowledge. They are among the 95% extension professionals’ whom farmers and entrepreneurs do not like to approach for services. He said that there are only about 5% of extension professionals who engage in learning and remain current with the latest knowledge; do not expect any undue benefits in return for their services; and highly value their clients and their needs and respect their time. Farmers value these professionals in return.

The above comments from an entrepreneur provide several insights. First, there are gaps in farmers needs and what extension workers are offering as services. Second, extension workers are not accountable to farmers for their services. The findings suggest that extension professionals have to improve their services and act professionally. To act professionally, one

should engage in continuous learning and be ethical, among other things. Since extension educators help farmers learn new knowledge, educators first have to be clear whether the message being delivered and/or taught is valid and current. They should ask themselves: Am I using the right method for teaching? Are farmers comfortable with my facilitation? Am I seeking undue advantage and is that affecting the way farmers learn? What if I work with farmers in their farms and demonstrate to them the technology and explain what it is and how it works? This entails both learning and research.

The opinion of Participant 1.2, which stood out from others, is worth mentioning. He said, “Agriculture is not only agriculture.” He pointed out that there are several embedded elements in agriculture—e.g. people, education, market, input, climate, soil, etc. This underlines the fact that there are pervasive biases in how service providers see or perceive their clients and interpret or understand their problems. They often see, examine and interpret things superficially and from their own perspectives and overlook underlying elements and causes. Such judgments mislead the whole system. There is need for systematic and holistic inquiry and reflection on past efforts to learn from the experiences and improve.

#### **2.5.2.9 Extension research linkages**

Disconnect between research and extension workers, and between research, extension and education is prevailing. Participants seemed worried that extension professionals are not meeting up to the expectations of the farmers. They felt that not involving extension professionals in research and applied research is why extension services is not effective today. One participant explained that even research-recommended technologies need field testing, and that extension professionals can do. He gave an example of how a corn variety did well in an



altitude and region other than that recommended by the research. One participant highlighted the urgency to involve extension professionals in applied research:

Education, research and extension are three aspects [of agricultural development]. What my basic education is contributing to my services? If we calculate this, we will find it to be hardly 5% or less than 5% in our context.... [Participant 2.2].

What we should be doing is, problems facing farmers have to be researched. Our extension is suffering because of the poor linkages between these three sectors [research, extension, education]. There are some people who work with farmers and acquire knowledge and they are working fine, but there is no system to address [promote] this [Participant 2.2].

The Participant 2.2 further added that there are several problems in farming that need research and simple technologies can address those problems. He stressed that extension professionals should be part of this process and extension services should provide conducive learning environment. Highlighting the need for adaptive research, he said he once tried to adapt a technology about sericulture that he learned during a training in Japan, but he could not do so because he could not get a small fund of NRs. 40,000 that he asked for [100 NRs = 1 USD].

The above findings and discussions reveal that both research and learning by doing or experiential learning are crucial skills for extension professionals. Studies show that the organizations where extension professionals work should provide appropriate learning environments vis-à-vis extension professionals should contribute to organizational learning so that both staff members and organizations enrich their skills (Baig & Aldosari, 2013; Hoffmann, 2014). However, how it can be assured that extension professionals acquire and articulate these competencies is still not that clear and needs further inquiry.

#### **2.5.2.10 Communication skills**

Participants mentioned communication skills in most of the issues that they raised during discussion, whether it was about coordinating with NGOs and others, doing research, providing

training, or communicating with social and political leaders in the community. One participant [Participant 3.5] stated that extension professionals should have “Capacity to communicate with local leaders. If they [community leaders] are motivated, they [each] can motivate another 50 people in the village. This skill is very important.”

They need to have good communication skills; with good speaking skills these qualities are important. Knowledgeable on subject matter, with good organizational management and behaviors, time management, self-management, proactive, problem-solving attitude, who can mingle and mix up in diverse cultures [Participant 3.4].

Effective writing skills, listening skills, public speaking skills, and ability to document extension work and report the results to the stakeholders also came up as essential communication skills during discussion.

#### **2.5.2.11 Leadership skills**

The scope of agricultural extension services is ever widening. There are many different stakeholders involved or associated with this sector and extension professionals have the challenge to bring them together and strengthen extension services. Within these backdrops, one participant mentioned that DADO chiefs are invited to be involved in almost every working committee in the district, whether it is about disaster mitigation or providing relief materials or food security, or something else. People expect more contributions in societal development from extension professionals than before. They should be ready to take the lead, if needed. In this vein, one participant elaborated that there are about fifty staff members in DLSO or DADO. How DADO and DLSO chiefs lead their teams, has huge impact on their performance.

Let me recall a view of a participant reported in this paper earlier: Agriculture is not only agriculture. Also, extension is not only about transferring technology or knowledge, and it is not a one-way process either as Hoffmann (2014) rightly pointed out that, “Extension is expected to

diversify its services beyond agricultural production...also in livelihood diversification” (p. 6).

Both agriculture and agricultural extension services are complex phenomena. Chen et al. (2013) contended that “Increasing complexity and the accelerating pace of change” (p. 1) in agricultural and associated systems warrant an extension workforce to be extremely dynamic and be able to garner stakeholders’ support. Leadership skills should enable extension professionals to find out who the stakeholders are and what subsectors build on extension services, examine who has what strengths and weaknesses, seek stakeholders input to solve the problems, and work to bring improvement in their organizations.

#### **2.5.2.12 Information and communication technologies (ICTs)**

Public agricultural extension services in Nepal covers only about 25% of the farmers; the rest either do not get any services at all or use private providers for services. Radio and television agricultural programs are popular information dissemination methods in Nepal (Suvedi & McNamara, 2012). One participant said that there are several private service providers who do not have any formal education, but they listen to these agricultural programs and advise farmers accordingly.

Another participant mentioned that extension professionals have to be proactive to let researchers know what the research problems are. This is the era of ICTs and messages can be disseminated within a few seconds, he added. Yet another Participant 1.4 said that some office chiefs have never used computer and they do not even know how to turn the computers on. The Participant 3.4 said that extension professionals should be computer and e-friendly. Several ICTs are increasingly being used in developing countries—for example, smart phone, mobile service, text messaging, etc. In recent years, access to and use of the Internet and smart phones have

increased greatly in Nepal (Pun, 2013). Because a large number of people can be reached in a short time and with minimal cost, these tools are effective in extension.

Farmers demand need-based, credible (trustworthy), relevant (have immediate application, locally adapted), reliable, timely and cost-effective information that they can use to make informed and effective decisions about their services/practices (Anderson & Feder, 2007; USAID, 2012). Research shows that disadvantaged farmers can benefit more from the use of ICTs (e.g., mobile phones) than those who are better off (Fu & Akter, 2010). The above views of participants, which are also in line with the current literatures, suggest that extension professionals should be able to use ICTs in their services and design messages that best fit the intended clients.

### **2.5.3 Objective 3. To generate a consolidated list of the core competencies required for the Nepalese agricultural extension professionals.**

The analysis of the findings of objectives 1 and 2 resulted in the list of eight core competencies that agricultural extension professionals in Nepal need.

- Communication skills
- Program planning
- Program implementation
- Educational and informational technology
- Diversity
- Program evaluation
- Personal and professional development
- Technical knowledge

The 21st century is the era of “knowledge economy” and “knowledge management” (Powell & Snellman, 2004) and knowledge management will dominate in education, training and extension for several years to come. Knowledge management refers to the production and utilization of knowledge. This is the era of partnership; collaboration; participation; bottom-up, not top-down; and demand-driven, not supply-driven services. Farmer’s needs should get priority

and be addressed through appropriate programs. In other words, the approach to agricultural extension should be farmers first, not technicians first (Chambers et al., 1989). Modernization of agricultural extension services stress the need for a dialogue and interactions among agricultural stakeholders; research, education and extension, in particular, should work together with farmers and engage their staff members in learning and co-learning.

Within these backdrops, technology transfer is the prerequisite to improve agricultural productivity; however, this alone is not enough to attain and sustain agricultural growth. Having technical competency will make extension professionals comparatively advantageous and effective, but the combination of both technical and process skills and competencies will make them even more competent (Vandenberg & Foerster, 2008). Developing agrarian countries such as Nepal need extension professionals who can bring people together, foster exchange of ideas and information, and make innovations happen. The consolidated list of core competencies is not exhaustive, but it includes key competency domains in which extension professionals need to attain mastery.

The above findings are largely consistent with the competency domains proposed by Cooper and Graham (2001) and Stone and Coppernoll (2004), but less so with the competencies—youth development, organizational planning, time management, risk management and liability for extension volunteers—proposed by Culp et al., (2007). Competencies consistent with the Ohio State University model (Ohio State University, 2015) are communication skills, problem solving and technical subject matter expertise. Learning by doing, organizational development and/or organizational management were not explicitly outlined by either Scheer et al. (2006) or Harder et al. (2010).

Among the eight core competencies discussed above, diversity and pluralism and organizational management are reported in the U.S. literature, but the focus group participants in Nepal emphasized technical subject matter expertise; program planning, including knowledge of national agricultural program, policies and strategies; and program implementation, which includes being familiar with government administrative and financial rules and regulations as key competencies. Though these competencies have their own importance, participants reiterated the need for skills on “learning by doing” among extension professionals. The following quote from a FAO document shows the poor state of knowledge management among extension workers in Nepal and justifies the call to include learning by doing, learning from farmers and co-learning as one of the core competencies.

The system does not embrace regular experimentation, reflection and learning for the improvement in the service delivery system. There are several good practices visible with farmers’ groups, which are published and broadcast through radio and television programs but are seldom internalized and replicated. Technical advices passed on to farmers are based mainly on recommendations from NARC but the extension workers do not have capacity to adapt them for area-specific problems and needs (Thapa, 2010, p.19).

Program planning, including needs assessment, was raised by a majority of the focus group participants. It is essential given the fact that “there is a mismatch between farmers’ real needs and interests and project focus” (Thapa, 2010, p.19). Highlighting the importance of program evaluation in AES, which equally applies to Nepal, too, Rivera and Qamar (2003) say:

Evaluation is important for sustainability, as well as for determining results and the prospects of project sustainability, not just with performance. All the elements are important, and affect one another. Performance affects results, and results affect sustainability. (p.60)

Though most of the competencies listed in U.S. sources and those generated from focus groups are somewhat similar, there are a few fundamental differences in these two competency

studies. In the United States, a Delphi and web survey was employed as the study method; studies were undertaken with a large sample; technical knowledge of the subject matter is not priority competency; and there have been continued efforts to assess and update the core competencies. In Nepal, on the other hand, there had been no study before this one on core competencies of extension professionals. Learning by doing has been highlighted by Nepali experts, which the U.S. literature did not mention. Surprisingly, technical competency emerged as one of the important competencies in both the studies.

Whether to consider technical competency as a core competency is debated. Technical competency does not belong to the genre of soft skills or process competencies. However, extension professionals have to play multiple roles when they are in the field—technicians, social mobilizers, trainers, advisors, and evaluators. They should have knowledge of technical subjects of their field. As a focus group participant observed, farmers’ expectations of extension professionals are very high. If extension professionals are not able to advise farmers with technical knowledge, they start avoiding farmers vis-à-vis farmers become reluctant to seek extension professional’s services. On the other hand, technical knowledge boosts extension professionals’ confidence and augments service delivery. Therefore, it would be fair to say that inclusion of technical subject matter expertise as a core competency is justifiable.

## **2.6 CONCLUSIONS**

In many developing countries such as Nepal, agricultural extension services are in need of revival. To help agricultural extension services transition to demand-driven, pluralistic and participatory organizations, their professionals have to be competent both in process and technical skills. If knowledge and skills are to be imparted to extension professionals, thereby preparing them to execute their work effectively, then it is crucial they undergo pre- and in-

service education and training. However, as reported by Thapa (2010), little is known about the process skills required for extension professionals. Consequently, training and education are of little help when it comes to improving agricultural growth. Against this backdrop, this study was conducted.

The literature on extension and core competencies as they pertain to the U.S. Cooperative extension services were reviewed, which resulted in 34 competencies and core competencies. The core competencies most sought after among U.S. cooperative extension workers are as follows: communication skills, professionalism, program planning, educational and informational technology, diversity and pluralism, facilitative leadership, technical subject matter expertise, international relationship, and knowledge of organization/organizational management. The core competencies listed here illustrate that U.S. Cooperative extension services aim for their extension cadres to be mindful of their clientele's needs and be able to communicate with their clientele employing suitable methods.

The data collection method employed in this study pertaining to second objective was focus group discussion, which aimed to gather extension experts' opinions of the core competencies—skills, knowledge, abilities—needed by Nepalese agricultural extension professionals. Three focus group discussions, attended by 23 experts, resulted in ten core competencies—program planning, program implementation, resource mobilization, technical knowledge, coordinating skills, professionalism, extension research linkage, communication, leadership and managerial skills, and information and communication technologies.

The majority of these core competencies appear to resemble the core competencies suggested elsewhere in the world, including those by the U.S. Cooperative extension services. Nonetheless, during the discussions a few perspectives stood out. First, the dominant core



competency needed by these extension workers tended to be technical subject matter expertise. Second, most participants stressed the need for strengthening research extension linkages; they underscored the importance and urgency for initiating, in agriculture extension services, applied research and “learning-by-doing” modules. They categorically stated that extension workers should actively participate and, when necessary, take lead in such researches. These research programs would not only provide extension workers opportunities to get first-hand information about the farming systems, but they would also be able to interact and learn from farmers. Third, the experts also raised such perspectives as cultural sensitivity, winning the trust of the farmers, attaining sustainable agricultural extension services, and consistently carrying out behaviors and actions expected of extension professionals. Fourth, the participants strongly felt that agricultural extension professionals should remain current with and versed in the government administrative and financial regulations and national agricultural programs, policies and strategies.

Consolidation and analysis of the findings of the first and second objectives resulted in eight core competencies—program planning, program implementation, communication skills, educational and informational technology, program evaluation, personal and professional development, diversity, and technical subject matter expertise.

## **2.7 RECOMMENDATIONS**

On the basis of the above results and discussion, this paper puts forward the following recommendations to the extension management in Nepal.

- Use the core competency list to design future surveys aimed to assess competencies and core competencies of extension professionals.

- Organize orientations for extension professionals, agricultural stakeholders, and other department staff members about the importance of core competency in extension service delivery.
- Mentor the agricultural extension agents focusing on identified core competency areas. Mentoring in extension approaches helps improve extension agents' proficiency in planning and implementing extension programs and their comprehension of the workplace environment (Strong & Harder, 2009).
- Include identified core competencies in preservice and in-service curricula of agricultural colleges, universities, technical schools, and training centers.
- Periodically review and update the core competency and competency list for agricultural extension professionals.

## **APPENDICES**

## Appendix A. Core Competencies List and Selection

Table 2.3 Core competencies used in U.S.

Michigan State University (MSU) (MSUE, 2015; (Vandenberg & Foerster, 2008)	Ohio State University (2015)	University of Nebraska Lincoln (UNL) (UNL, 2005)	University of Missouri (MU) (MUE, 2015)	Iowa State University (ISU) (ISU, 2015)	North Carolina State University (NCSU) (Maddy et al., 2002)	Washington State University (2015)	Oklahoma State University (2015)	Gibson and Brown (2003); Gibson (1994)	Texas A & M (Stone & Coppernoll, 2004)	University of Florida (Harder, 2015)
Program planning and development	Communication	Successful teacher	Communication	Communication and interpersonal relations	Community and social action processes	Program planning and delivery	Communication	Communication	Subject matter expertise	Program planning and development
Program implementation and delivery	Continuous learning	Subject matter competent	Educational programming and knowledge of subject matter	Depth and scope of ISU extension and outreach	Diversity/pluralism/multiculturalism	Subject matter expertise	Flexibility	Educational process	Organizational effectiveness	Extension teaching, tools and methods
Evaluation, applied research and scholarship	Customer service	Skilled communicator	Inclusivity	Equity and diversity	Educational programming	Communication skills	Initiative	Effective thinking	Develop and involve others	Program evaluation
Communication skills	Diversity	Inclusiveness	Information and education delivery	Partnership development	Engagement	Cultural competency	Organization	Extension organization and administration	Communications	Subject matter expertise
Educational and informational technology	Flexibility and change	Entrepreneurial	Interpersonal relations	Professionalism and leadership	Information and education delivery	Organizational marketing and external linkages	Professional orientation	Program planning and development	Action orientation [program implementation]	Extension organization and administration
Facilitative leadership	Interpersonal relationships	Collaborator and/or team player	Knowledge of organization	Project management	Interpersonal relations	Leadership	Program planning, implementation, and evaluation	Research and evaluation	Personal effectiveness	Information and communication technologies
Diversity and multiculturalism	Knowledge of extension	Leadership	Professionalism		Knowledge of organization		Service orientation	Technical knowledge		External linkages and collaborations
Marketing and quality service	Professionalism	Balance			Leadership		Teamwork/ leadership	Understanding human development		Interpersonal leadership
External linkages	Resource management	Change manager			Organizational management		Technology	Understanding social system		Volunteering
Professionalism and career development	Self-direction	Professionalism			Professionalism					Personal and professional development
	Technology adoption and application	Citizenship			Volunteer development					
	Teamwork and leadership									
	Thinking and problem solving									
	Understanding stakeholders and communities									

Table 2.4 Selection of core competencies required for extension professionals

S. N.	Core competencies	Core competencies used by various U.S. universities and other sources											Number of universities and/or literature reporting
		1	2	3	4	5	6	7	8	9	10	11	
1	Communication skills	Y	Y	Y	Y	Y		Y	Y	Y	Y		9
2	Professionalism	Y	Y	Y	Y	Y			Y			Y	7
3	Technical subject matter expertise			Y	Y			Y		Y	Y	Y	6
4	Knowledge of organization and/or organizational management						Y	Y	Y	Y	Y	Y	6
5	Program planning	Y					Y	Y		Y		Y	5
6	Educational and informational technology	Y					Y		Y	Y		Y	5
7	Interpersonal relationship		Y		Y	Y	Y					Y	5
8	Diversity and pluralism	Y	Y			Y	Y						4
9	Facilitative leadership	Y					Y	Y	Y				4
10	Program implementation	Y						Y	Y		Y		4
11	Evaluation and applied research	Y						Y		Y		Y	4
12	Cultural competency						Y	Y		Y			3
13	Flexible/Adaptable		Y		Y				Y				3
14	Self-directed		Y		Y				Y				3
15	External linkage and collaboration	Y						Y				Y	3
16	Inclusive			Y	Y								2
17	Manager			Y	Y								2
18	Team player				Y				Y				2
19	Knowledge of extension		Y			Y							2
20	Engagement				Y		Y						2
21	Extension teaching, tools and methods											Y	1
22	Volunteer development											Y	1

Table 2.4 (cont'd)

23	Partnership development					Y							1
24	Effective thinking									Y			1
25	Sustain the balance			Y									1
26	Marketing and quality service	Y											1
27	Resource management		Y										1
28	Knowledge of human resource development									Y			1
29	Entrepreneurial			Y									1
30	Project management					Y							1
31	Successful teacher			Y									1
32	Continuous learning		Y										1
33	Personal effectiveness										Y		1
34	Develop and involve others										Y		1

## Appendix B. Invitation to Focus Group Discussion

<Date>

Dear <Firstname> <Lastname>,

### Subject: Invitation to Focus Group Discussion

We, at Michigan State University, are conducting a study, “Assessment of the core competencies of the Agricultural extension professionals in Nepal.” From this study, we hope to identify the core competencies required for agricultural extension professionals and help improve in-service and preservice curricula on extension education and training in Nepal.

One of the methods of data collection will be focus group discussions. Because of your expertise and extensive experience in agricultural and education services, we would like to invite you to a focus group discussion (FGD).

The FGD has been scheduled for <English date (Nepali date)>, at <time> in <venue>. This focus group session will last about two hours. There are no foreseeable risks associated with participating in this study. Your participation in the focus group is voluntary. You may choose not to answer specific questions and stop participating at any time. The data for this study will be kept confidential. You will remain anonymous in the report.

If you have concerns or questions about this study, such as scientific issues, or to report an injury, please contact the researcher, Dr. Murari Suvedi, at the Department of Community Sustainability, Michigan State University, Room 135, Natural Resources Building, East Lansing Department of Community Sustainability, Michigan State University, MI 48824; suvedi@msu.edu; or 517-432-0265.

If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University Human Research Protection Program at 517-355-2180; fax 517-432-4503; or irb@msu.edu, or write to 207 Olds Hall, MSU, East Lansing, MI 48824.

I hope you will be able to participate.

Sincerely,



Murari Suvedi, Professor  
Department of Community Sustainability  
Michigan State University

## Appendix C. Consent Letter for Focus Group Discussion Participants

Dear <Firstname> <Lastname>,

Welcome! I am Ramjee Ghimire, graduate student in the Department of Community Sustainability at Michigan State University. I would like to thank you for accepting our invitation to participate in this focus group discussion. I will be the moderator for today's session. Helping me is Ms. Bineeta Gurung, also a graduate student in the Department of Community Sustainability at Michigan State University.

The purpose of this meeting is to seek your opinions about core competencies of agricultural extension professionals in Nepal. Specifically, we would like to focus on essential knowledge, skills, abilities, and behaviors required by Agricultural Development Officers and/or Subject Matter Specialists including the Livestock Development, and Veterinary Officers. Your thoughts and opinions will be valuable to improve agricultural extension education and training and extension services in Nepal.

This meeting will last for about two hours. Your participation is voluntary. You may discontinue participation at any time you want, and you may choose not to answer specific questions. Refusal to participate will involve no penalty or loss of benefits to which you are otherwise entitled. The data for this study will be kept confidential. You will remain anonymous in the report.

If you have concerns or questions about this study, such as scientific issues, or to report an injury, please contact Dr. Murari Suvedi, Department of Community Sustainability, Michigan State University Room 135, Natural Resources Building, East Lansing, MI 48824; [suvedi@msu.edu](mailto:suvedi@msu.edu); or 517-432-0265. If you have questions or concerns about your role and rights as a research participant, would like to obtain information or offer input, or would like to register a complaint about this study, you may contact, anonymously if you wish, the Michigan State University Human Research Protection Program at 517-355-2180; fax 517-432-4503, or [irb@msu.edu](mailto:irb@msu.edu), or write to 207 Olds Hall, MSU, East Lansing, MI 48824.

Thank you.

Your signature below means that you voluntarily agree to participate in this research study.

_____	_____	_____
Print Name	Signature	Date



## **Appendix D. Focus Group Discussion Guide**

Welcome!

Let me share some ground rules for this session. There are no right or wrong answers. Please feel free to share your views, opinions and thoughts, even if they differ from other participants' ideas, but please listen to others' views carefully and with respect. We will be taking notes and audio recording this session, because we do not want to miss any important piece of information that emerges from our discussions. Please let one person speak at a time so that we can transcribe all the content of the audiotapes. We will be on a first-name basis during this session, but let me assure you again that your responses will be kept completely confidential, and your name will not appear in any reports.

We have placed name cards on the table to help us remember each other's names. Let us begin with each of you sharing a little bit about yourselves. Please tell us your name, your position, where you work and your experience in agricultural services.

1. What first comes to your mind when you hear the words “Agricultural Extension Services in Nepal”?
2. Think about agricultural subject matter specialists (SMSs) working in various District Agricultural and Livestock Services offices. What services do these agricultural extension professionals provide?
3. Think about District Agricultural and Livestock Office chiefs working in various district agricultural and livestock offices. What services do these agricultural extension professionals provide?

Now let us discuss the core competencies of extension professionals. Core competencies are the cluster of knowledge, skills and abilities that agricultural extension professionals require to perform their tasks well and as expected by their clients. Core competencies refer to process skills and competencies that help deliver information and knowledge to clients. The combination of these core competencies with technical knowledge and skills allow staff members to be more effective in serving their clients.

4. Think about various services that district agricultural development officers of District Agricultural Development offices and chiefs of District Livestock Services offices provide to farmers, their staff members and other stakeholders. What core competencies do these extension professionals require to perform their jobs well?
5. Think about various services that subject matter specialists (SMSs) in District Agricultural Development and District Livestock Services officers provide to farmers and other stakeholders. What core competencies do these extension professionals require to perform their jobs well?

Now let us talk about the core competencies for agricultural extension professionals or program officers in non-governmental organizations (NGOs).

6. What services do these NGOs provide? Are there any fundamental differences in services they provide from that of governmental organizations? If so, what are the differences?
7. Think about the roles of agricultural extension professionals and/or agricultural program officers serving in various agricultural-based non-governmental organizations in Nepal. What core competencies do these extension professionals require to perform their tasks well?
8. How adequately are the core competencies required for agricultural, livestock and NGO extension professionals addressed in the course curricula at Tribhuvan University-Institute of Agricultural and Animal Science, Agricultural and Forestry University and Purbanchal University?

*[Moderator shares a summary of the discussion with the participants].*

This is a summary of what we discussed today. Did I miss anything or major points? Do you have comments or suggestions?

*[The focus group ends with the moderator inviting participants to take food and thanking participants for their time and input.]*

Thank you for your participation.

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## **CHAPTER 3 PERCEPTIONS OF CORE COMPETENCIES OF EXTENSION PROFESSIONALS IN NEPAL**

### **ABSTRACT**

To better align training and education with extension services needs, extension management should have up-to-date profiles of their human resources and they should also know the extent to which extension agents value their own competencies. The goal of this study then was to determine the perceived level of importance that extension professionals in Nepal have to core competencies. The study population consisted of the chiefs, subject matter specialists and technical officers in district agricultural development offices and livestock services offices; and program officers in agriculture-based non-governmental organizations. Researcher-designed instrument was employed for the study. Focus group discussions and a literature review were the bases for the 48 competency statements that survey instrument consisted of. Self-administered (in-person and web) surveys were conducted in August and September of 2015, with 349 professionals participating. Data were analyzed using descriptive and inferential statistics. Findings show that respondents perceived all eight core competencies—program planning, program implementation, communication skills, educational and informational technology, program evaluation, personal and professional development, diversity and technical subject matter expertise and associated skills to be important and very important to their work. Respondents' perceptions of importance differed by their gender, current position, and education level, but not by their undergraduate college/university, by primary organization, or by experiences in extension. Findings have implications for improvement of agricultural extension education and training in Nepal.

*Keywords:* extension professionals, core competencies, core competency importance, Nepal

### **3.1 INTRODUCTION**

The agricultural system worldwide is changing fast and becoming more complex than ever before. So also are the information and knowledge needs of agricultural stakeholders, including farmers. The need is high for more responsive, accountable, and competent extension workers who value their work and their clients. This warrants extension management to have information of the competencies of their extension human resources, so they can design agricultural extension and training programs—in-service, preservice—in line with needs of extension services (Belay & Abebaw, 2004; Davis & Sulaiman, 2014). Many developing countries—Nepal among them—are yet to prepare competency profiles of their extension professionals. This study seeks to address this knowledge gap.

The scope of agricultural extension services is expanding. Globalization, population growth, advanced technology, and other forces continually press the need for new services. Christoplos (2010) said, “Extension includes technical knowledge and involves facilitation, brokering and coaching of different actors to improve market access, dealing with changing patterns of risk and protecting the environment” (p. 2). Extension professionals have to not only educate farmers but also demonstrate themselves to be multi-skilled and exemplary workers who can lead agricultural innovation. Explaining the concept of “new extensionist, Davis and Sulaiman (2014) contended that extension human resources are expected to be cognizant of the changing contexts, new opportunities and challenges facing extension services and be prepared to perform new roles such as helping link farmers with credit institutions and input suppliers, dealing with food insecurity and gender integration, and linking farmers to markets to name a few.

Extension, research, and education are three pillars of agricultural development and they should complement each other to keep up agricultural development. Extension, in particular, serves as the linkage between education and research. Similarly, extension workers serve as the bridge between policy group and research stations, and farmers' groups. As pointed out by Belay and Abebaw (2004), "The effectiveness of agricultural extension work highly depends on the availability of extension professionals who are qualified, motivated, committed and responsive to the ever changing social, economic and political environment" (p. 147).

Most developing countries are on a mission to revamp their traditional extension services and adopt a bottom-up extension approach in which people engage in and take responsibility for need identification and setting priorities (Belay & Abebaw, 2004). The new approach does not curtail the roles of the extension workers in agricultural development; rather, it expects more—collaboration, coordination, and facilitation—from extension workers. The need is higher than ever before for extension workers with knowledge of these various extension approaches and skills, and abilities to facilitate the agricultural extension services transition.

Often criticized for not revealing the truth about their outcomes and impact, extension services are now facing accountability demands. By effectively evaluating their work and publicizing the results, extension services can garner the support of politicians, beneficiaries, and other stakeholders and seek additional funding for their work (Van den Ban & Hawkins, 2002). Some extension agents see evaluation as a threat. In reality, evaluation helps them know how well they are doing what they are doing so that they can improve themselves and improve their services to farmers (Van den Ban & Hawkins, 2002).

According to Suvedi (2011) and Van den Ban and Hawkins (2002), extension services are being subjected to such questions as the following: Is extension focusing on the pressing

needs of the clients? Is extension able to adapt to changing contexts? Do extension programs have an impact on the community? These questions apply both to extension managers who design extension policies and mobilize resources for extension services and to extension professionals who implement extension programs in the field. This leads to another set of questions: Are extension workers trained to provide extension services as expected by clients? Are they sufficiently competent to provide their services? Strong anecdotal evidence suggests that most of the questions could be answered with a “no,” giving rise to much criticism of these services. To address these issues, monitoring and evaluation should be a core activity in extension services, and extension workers should be able to effectively evaluate the outcomes and impacts of their extension programs and improve them as needed.

Outlining the importance of process skills among extension professionals, Landini (2016) argues that extension professionals work in complex situations and being technically competent is not enough to be successful and efficient workers. Extension workers have to interact and work with farmers and peers as catalysts for knowledge brokering. Since they work with diverse clients and stakeholders and provide a variety of services, they need good interpersonal communication skills, too. Landini presented qualities of good extensionists as interpersonal skills, ability to work effectively with farmers and co-learning with farmers, and ability to use extension approaches appropriate to the political, cultural, institutional and environmental contexts of the clients, among others.

Competent staff members are assets of their organizations. Referencing Dubois (1998), Burke (2002) stated that “in the absence of worker competencies, it would be difficult for organizations to achieve desired outcomes” (p. 2). Extension human resource development should give a high priority to assessing the competency of extension staff members.

Human resource development begins with needs assessment. Since needs vary from individual to individual, it is imperative to know how perceived needs vary according to demographics. Extension agents' individual perceptions or values affect their performance (Ensle, 2005) and it is worth periodically examining extension professionals' perceptions of various aspects of their jobs, including core competencies. As of yet, no documentation exists of the demographics and competencies of extension professionals in Nepal. "Core competency" refers to knowledge, skills, abilities and attitudes that help extension professionals perform their extension tasks well and as expected by their clients.

### **3.2 STUDY GOALS AND OBJECTIVES**

The objectives of this study are: (i) To determine the level of importance of core competencies as perceived by extension professionals in Nepal, and (ii) To examine whether perceived importance of core competencies vary by demographic characteristics of extension professionals.

### **3.3 LITERATURE REVIEW**

Collecting data from the North Carolina Cooperative Extension professionals, Burke (2002) examined relationships between respondents' demographics and their perceived knowledge, importance, and use of competencies. He found that the importance of competencies differed neither by age, gender, education, years of experience, job responsibilities, nor total staff size, though it did differ by ethnic background.

Education should complement competency. However, education in many developing countries is theory-laden, top-down, supply-driven and employs one-way teaching approach, which learners do not seem to be comfortable with. Understanding whether extension

competency has improved due to students and extension workers attending training and education is vital to extension management.

Farming and other communities face complex problems that call for effective extension and advisory services. In a study conducted among extension educators in the north central region of the United States, Ghimire (2010) found that the effective delivery of extension services depended a great deal on needs assessment/analysis and program development, learning systems, delivery systems and evaluation systems. Ghimire associated 42 competencies that were highly important to carrying out these services. Respondents' perceptions of competencies differed by age and gender.

Assessing perceptions of the importance of professional competencies related to needs assessment among extension professionals in the United States, Ghimire and Martin (2011) found gender and education as significant but weak predictors of determining respondents' perceptions. Not contributing to the prediction of these perceptions were other socio-demographic parameters—age and years of experience of working as extension professionals.

Highlighting the need for extension professionals to be good managers of extension services, Lopokoiyit et al. (2013) argued that extension professionals today have to be capable of building and maintaining relationships with stakeholders, getting and giving information, influencing people, and making good decisions. They should also be proficient at communication, evaluation, coordination, reporting and budgeting, among others. The literature also indicates that most extension professionals have been trained in traditional education systems focusing on technical aspects of crop and livestock production, that there exist gaps in process skills among extension workers, and that application of knowledge in the real field situation remains weak (Lopokoiyit et al., 2013; Swanson, 2008).

Teh (1980) studied the importance of professional extension competencies to the performance of extension professionals and of including core competencies in pre- and in-service training and education. He generated nine constructs or core competencies important to the work of extension workers: program planning, program implementation, program evaluation, leadership development, youth development, public relations and rural affairs, supervision and administration, personal development, and research. He found strong and positive relationships between perceptions of the importance of core competencies and performance, and perceptions of importance to inclusion in training and education programs.

Gombe et al. (2015) studied extension workers' competencies needed for effective management of self-help groups in Nigeria. They found that elements important to their work included organizational development, building leadership capacity, interpersonal skills, and resource management skills. Cooper and Graham (2001) studied the core competencies of county extension agents and supervisors in Arkansas, finding differences between these two groups in need and perceptions of the importance of the core competencies.

### **3.4 CONCEPTUAL FRAMEWORK**

The conceptual framework of this study is grounded on the work of Rivera and Alex (2008), Mulder (2007), and Mulder et al. (2011). The framework encompasses methodological, individual, social and technical competencies, which are represented by eight constructs or core competencies—program planning, program implementation, communication skills, use of education and information technology, program evaluation, personal and professional development, diversity, and technical subject matter expertise. The focus group discussions with extension experts and themes drawn from literature review are the bases for these eight core competency areas. Related to this typology is the explanation in Vandenberg and Foerster



(2008), who linked competencies with five objectives of cooperative extension services: (1) helping people learn and change, (2) working collaboratively with diverse people in community settings, (3) marketing and communicating effectively about their work, (4) measuring the impacts of their programs, and (5) employing technology to enhance everything they do. Linked to the above constructs and assumed in this study are the notions that staff members know their competency needs and value their competencies (Ensle, 2005). The literature suggests that extension professionals' perceptions are influenced by perceived role expectations and by organizational and social environments (Okwoche et al., 2011). This study has chosen to have extension professionals self-rate the importance of competencies. Since staff member's perceptions of knowledge, skills, abilities and competency needs vary by their contexts, this study seeks also to see how perceptions vary by respondents' demographics. It is hoped the study finding will help identify important competencies and design preservice education as well as in-service training curricula accordingly. This ultimately enhances extension professionals' capability to serve their clients and strengthen extension services.

### **3.5 STUDY METHODS**

#### **3.5.1 Study Design**

The focal persons of extension services are extension professionals. If they are competent, extension services are bound to be effective. Besides serving as the medium to pass on information between researchers and farmers, extension professionals facilitate the extension process, which is crucial to effectively serve the extension clientele. As noted, extension professionals' perceptions drive their work. It is worth knowing then what degree of importance they attach to competencies. This study employs cross-sectional research design.

The self-administered survey is a popular research method for studying human knowledge, attitudes, and skills. The survey method is widely used for examining human behaviors as well as program outcomes and impact. Several sources have underscored the merits of using surveys and suggested ways to minimize errors and ensure their reliability and validity (e.g., Dillman et al., 2009; Vaske, 2008). A survey is useful for explaining the characteristics of a large number of people. Numerous questions can be asked in a single survey, and a large number of samples can be covered within a short time (Vaske, 2008).

Previous studies on extension professionals have used, and found useful, the self-assessment method to examine the importance of core competencies (Karbasioun et al., 2007; Khan, 2003). According to Tyler (1971), learners' (or staff members') self-assessments of core competencies are crucial to achieving individual and organizational goals. The assumption here is that learners, especially adult learners such as extension professionals, are cognizant of what they need to know, what skills and abilities—competencies—they need and what they should do to execute tasks assigned to them so as to serve well their clients.

In this study, participants self-assessed the importance of the competencies. In-person and web self-administered surveys were used to collect data. In-person surveys have high response rate, but they are relatively costly and time consuming. Those samples that could not be reached in in-person survey were invited to web survey.

### **3.5.2 Study Population and the Sample**

The study population consists of 1,058 extension professionals—chiefs, subject matter specialist (SMSs), technical officers (TOs) in District Agricultural Development Offices (DADOs) and District Livestock Services Offices (DLSOs), and agricultural program officers in agriculture-based NGOs. The sample of 349 who participated in the study came from the

purposively selected 48 of 75 districts representing three eco-zones, five development regions, priority extension services areas and agricultural production zones.

Table 3.1 Sampling frame and response rate

Organization	Population	Web survey			In-person		Final	
		Sent	Response	Usable surveys	Response	Usable surveys	Usable surveys	Response rate (%)*
Department of Agriculture	516	118	20	16	168	144	160	31.00
Department of Livestock Services	292	75	3	3	180	149	152	52.05
Non-governmental Organization	250	109	27	25	12	12	37	14.80
Total	1,058	302*	50	44	360	305	349	32.98

Source: DLS (2012); DOA (2012); (N. P. Sharma, personal communication, May 25, 2015; Y. KC, personal communication, May 12, 2015); Author.

\* 34 emails bounced back. \*Response rate in relation to population ( $N = 1,058$ ).

To get perspectives of both government and non-government extension professionals and to minimize nonresponse biases, both web and in-person surveys were used. A previous study in Nepal by Suvedi and McNamara (2012) reported a 45% response rate to its web survey and web survey was found to be effective to assess extension professionals' perceptions. The web survey had the same questions as the self-administered survey. In September 2015, a web survey was conducted (using SurveyMonkey.com) among 302 professionals. Respondents were sent an email with a link to the survey. A cover letter (Appendix B) explained the purpose, objectives, process, and voluntary participation in the survey. Three follow-up emails were sent to non-respondents over a 3-5-day interval (see appendices C-E). Thirty-four emails bounced back. The response rate to web survey was 16.79% (Table 3.1). Six web surveys were unusable.

Three hundred sixty professionals participated in an in-person survey. Responses to in-person survey were cent percent. However, subtracting unusable ( $n = 55$ ) surveys (13 with missing data; 42 filled by assistant level staff who were not part of the study population), 305 surveys were left. Combining 305 in-person surveys with 44 web survey resulted into 349 survey data for this study. Overall, response rate was 32.98%, which is typical (or even better) to the social science research like this assuming  $\pm 5\%$  margin of error and 95% confidence level (Taylor-Powell, 1996).

### **3.5.3 Survey Instrument**

The survey instrument (see Appendix A) was developed based on competencies and core competencies drawn from a review of the literature and from suggestions by extension experts during the focus group discussions. The instrument contained three sections: Section 1 had eight constructs (called core competency) with five to seven statements (competencies) in each. The constructs—program planning and communication skills—had six statements each; program implementation, education and informational technology and program evaluation had seven statements each; and the rest, i.e., personal and professional development, diversity, and technical subject matter expertise had five statements each.

As used in previous extension competency assessment studies (Lopokoityit et al., 2013; Namdar et al., 2010; Movahedi & Nagel, 2012), each competency statement had two parts—importance and level of competency—that were grounded in a five-point Likert-type scale designed to examine respondents' perceptions. For importance, 1 equated as “not important,” 2 as “somewhat important,” 3 as “average,” 4 as “important,” and 5 as “very important.” For level of competency, 1 equated as “very low,” 2 as “low,” 3 as “moderate,” 4 as “high,” and 5 as “very

high.” As this study is focused on respondent perceptions of importance of competencies, only ratings for importance were used for analysis.

Section 2 contained questions seeking information on additional competencies required to work and appropriate ways to acquire competencies. Section 3 contained six demographic items about gender, age, period of work in extension profession and current position, undergraduate college, and primary organization. Demographic details were necessary to know who the extension professionals were, and whether and to what degree the perceptions of importance differed by demographic characteristics.

For objective 1, the variables of interest were the ratings on the importance of core competencies. It was assumed that when staff members felt certain core competencies as essential for their extension tasks, they would value those competencies more; that is, it was assumed they would want to acquire them.

For objective 2, the dependent variables were the ratings of the importance of core competencies; the independent variables were the demographic characteristics—gender, primary organization currently working (DLS, DOA, NGO), undergraduate college (TU and AFU, PU and colleges other than TU and AFU in Nepal, colleges outside Nepal), experience in extension services (years), current position (DADO or DLSO Chief, SMS, Technical Officer, NGO Program Officer), experience in the current position (years), age (years), and educational qualification (I. Sc. Ag. or equivalent, B.Sc. Ag or equivalent, Postgraduate degree (M. Sc. Ag. or Ph.D. degree).

#### **3.5.4 Pretesting the Survey Instrument**

The original survey containing 60 statements representing eight core competencies was field tested among 22 extension professionals—16 in-person and 6 online—who were not part of

the actual study. The researcher met eight respondents from among the preservice respondents—individually. The respondents reviewed the instrument and research questions and filled out the instrument with the researcher present. Their feedback was important in examining whether the targeted subjects would interpret and/or understand the questionnaire and whether they would encounter any difficulties answering the questions.

The survey was modified integrating their feedback. One side of the survey was in English and the other side in Nepali, the local language and respondents were free to choose either of the versions. Respondents shared that the survey was relatively long and that it would be easier to understand and be quicker to fill out if it were available in a local language as well.

A panel of experts at Michigan State University and the extension experts in Nepal reviewed the survey instrument for its content and face validity. As shown in Table 3.2, reliability coefficients calculated post-hoc ranged from .75 to .89, indicating that the statements were clear and understandable, and that they were consistently measuring the perceptions of the respondents. Constructs with reliability coefficients .7 or higher are acceptable in social science research (George & Mallery, 2003).

Table 3.2 Reliability coefficients of core competencies

Core competency	Number of sub-competency statements included in the core competency	Reliability coefficient ( $N = 349$ )
Program planning	6	.75
Program implementation	7	.81
Communication skills	6	.79
Educational and informational technology	7	.86
Program evaluation	7	.89
Personal and professional development	5	.83
Diversity	5	.84
Technical subject matter expertise	5	.85

### **3.5.5 Data Collection**

The data were collected in August and September 2015 by employing in-person and web surveys. For the in-person survey, the data collection started with the researcher debriefing the extension professionals on the goals, objectives, and significance of the study and also explaining the sections of the survey and methods to fill it out. The researcher requested the subjects to read the consent form, and those who agreed to participate signed the consent form. Once subjects consented to voluntarily participate in the study, the researcher requested them to fill out the survey. Three hundred five in-person surveys were usable.

For web surveys the researcher met with DOA, DLS and NGO authorities and sought emails of their field extension professionals. Altogether 509 (DOA = 240, DLS = 160, NGO = 109) emails were collected. The researcher called district and regional offices too and requested to provide emails of their extension professionals. Departmental permission was sought prior to contacting district and regional offices. Not all extension professionals had emails. Usually, those working in remote districts, with a longer experience in extension and with lower educational qualification seemed not to have emails. After discounting those who participated to in-person surveys there were 302 professionals remaining in email lists of 509 and they were requested to participate in a web survey. As explained above reminder emails were sent to non-respondents and altogether 50 professionals participate to web survey and 44 of the responses were usable.

### **3.5.6 Data Analysis**

Each individual survey was checked for incomplete and/or missing data. Data were entered and/or downloaded into the Statistical Package for Social Sciences (SPSS). Data from web and in-person surveys were examined for variation in respondents' perceptions and

demographic attributes. No significant differences were found. Therefore, the web and in-person data set were combined and the combined data set served as the basis for this paper.

For the purpose of this study, index scores were calculated for each core competency. The index score is equal to the sum of ratings of competencies pertaining to the particular construct divided by number of competencies or statements pertaining to that construct. Descriptive statistics of individual competencies were also calculated and mentioned wherever appropriate. Index scores were used to examine the overall perceptions of importance and difference in perceptions by respondents' demographics.

The data were analyzed using descriptive statistics (frequency, mean, standard deviation) and inferential statistics (independent sample *t*-test and one-way analysis of variance). Descriptive statistics can be used to discover respondents' answers (what is or what was) to the questions (Fraenkel et al., 2012); inferential statistics, such as independent *t*-test, ANOVA (F-test), are useful to examine the differences in means among and between categorical independent variables (Agresti & Finlay, 2009). The cut-off point for significance was set at 0.05.

The few limitations and challenges pertaining to this study were as follows. First, this study was conducted in the aftermath of a massive earthquake in Nepal. Most extension professionals whom the researcher met with were either busy with earthquake relief work or were affected by the earthquake. Second, soon after the earthquake, Terai-based (Terai is one of the three eco-zones of Nepal representing southern belt of the country) political parties called strikes. The researcher could not reach extension professionals in some of the districts in the southern part of Nepal and could not solicit their opinions.



### 3.6 STUDY FINDINGS

#### 3.6.1 Demographic Characteristics of Respondents

Demographic characteristics of respondents are presented in Table 3.3. Of the 349 respondents, the majority (93.1%) were males. The percentage of female respondents was 6.9%, which is close to the percentage of female extension workers in Nepal—7.7% (Worldwide Extension, 2011). Three hundred forty-two respondents indicated their age, which on average was 45.97 ( $SD = 9.67$ ) years ranging from 23 to 66 years. The mode and median ages of respondents were 52 and 50 years, respectively. When divided into three groups—35 years and under, 36 to 50 years and 51 years and above—21.1% fell into the first, 35.1% in the second, and 43.9% in the third category.

Table 3.3 Respondents' demographic characteristics

Demographic characteristics		<i>n</i>	%
Experience in extension ( <i>N</i> = 325)	≤ 9 years	78	24.07
	10-19 years	41	12.65
	20-29 years	117	36.11
	≥ 30 years	88	27.16
Current position ( <i>N</i> = 345)	DADO/DLSO chief	66	19.1
	SMS	111	32.2
	NGO-PO	34	9.9
	TO	134	38.8
Highest education ( <i>N</i> = 344)	I. Sc.	128	37.2
	B.Sc.	82	23.8
	Postgraduate	134	39.0
Undergraduate college/university ( <i>N</i> = 337)	TU/AFU	246	73.0
	PU and non-TU	50	14.9
	Universities outside Nepal	41	12.2
Age group ( <i>N</i> = 341)	≤ 35 years	71	43.95
	36-50 years	119	35.10
	≥ 51 years	149	20.94
Gender ( <i>N</i> = 349)	Female	24	6.9
	Male	325	93.1

Table 3.3 (cont'd)

Primary organization	DOA	160	46.0
( <i>N</i> = 348)	DLS	152	43.7
	NGO	36	10.3

*Note.* B.Sc. = Bachelors in Science, I. Sc. = Intermediate in Science, TU = Tribhuvan University, PU = Purbanchal University, IAAS = Institute of Agriculture and Animal Science, HICAST = Himalayan College of Agricultural Sciences and Technology

Of the respondents, 163 (*n* = 160, 46%) were from the Department of Agriculture, 152 (43.7%) from the Department of Livestock Services, and 36 (10.3%) from non-governmental organizations (NGOs). One respondent did not indicate his/her primary organization.

The 344 respondents indicated their highest level of education; 128 (37.2%) held Intermediate (12 years) or equivalent degrees; 82 (23.8%) had bachelor's or equivalent degrees; and 134 (39%) had postgraduate degrees. A majority of the participants (73%) indicated that they had completed their undergraduate and/or basic agricultural education at the Tribhuvan University (TU) or Agricultural and Forestry University (AFU) in Nepal; 50 (14.9%) had completed their education at Purbanchal University (PU) or other universities within Nepal; 42 (12.2%) had attended colleges outside Nepal. Twelve respondents made no mention of their colleges. There were relatively more respondents (18.50%) in DLS who attended PU-HICAST and other Nepal-based colleges and universities (other than TU-IAAS/AFU) than in DOA (11.70%). Proportionately graduating from colleges outside Nepal were more NGO respondents (13.70%) than respondents from DLS (11%) or DOA (12.30%).

The DOA and DLS chiefs (*n* = 66) made up 19.1% of the respondents. Approximately one-third (111; 32.2%) of the respondents were subject matter specialists (SMSs). Only 34 (9.7%) were NGO program officers. Technical officers made up more than one-third (134;

38.8%) of respondents. Four respondents did not indicate their current position. Respondents had on average been in extension services for 20.32 ( $SD = 10.61$ ) years.

### 3.6.2 Perceptions of Overall Importance

The descriptive statistics calculated for the importance of core competencies show that respondents rated all eight core competencies as important or very important to their work (Table 3.4). Personal and professional development received the highest rating ( $M = 4.57$ ,  $SD = 0.46$ ); receiving the lowest rating ( $M = 4.37$ ,  $SD = 0.49$ ) was program evaluation.

Table 3.4 Descriptive statistics for perceptions of importance of core competencies

Core competency	Number of statements used to compute mean	Mean (SD) ( $N = 349$ )
Program planning	6	4.44 (0.46)
Program implementation	7	4.44 (0.46)
Communication skills	6	4.49 (0.44)
Educational and informational technology	7	4.41 (0.51)
Program evaluation	7	4.37 (0.49)
Personal and professional development	5	4.57 (0.46)
Diversity	5	4.45 (0.48)
Technical subject matter expertise	5	4.47 (0.50)

*Note.* Scale: 1 = Not important, 2 = Somewhat important, 3 = Average, 4 = Important, 5 = Very important

### 3.6.3 Perceptions of Importance of Core Competencies by Demographics

#### 3.6.3.1 Primary organization

A one-way ANOVA was computed to compare the ratings for the importance of core competencies by respondents from three organizations—the Department of Agriculture (DOA) and the Department of Livestock Services (DLS), and the Non-Governmental Organization (NGO). Significant differences were found among the groups for their ratings on diversity,  $F(2,$

345) = 3.954,  $p < .05$ ; and technical subject matter expertise,  $F(2, 345) = 4.819$ ,  $p < .05$ . (Table 3.5). There were no significant differences in ratings for other competencies by respondents' affiliation organization. The post-hoc analyses using LSD show significant differences in perceptions of DOA and NGO respondents for diversity with DLS respondents and of DOA respondents with other two groups for technical subject matter expertise.

Table 3.5 One-way ANOVA results showing differences in perceptions of importance of core competencies by primary organization

Core competency	Affiliating organization			<i>df</i>	<i>F</i> value	<i>p</i> value
	DOA ( <i>n</i> = 159) (Group 1)	DLS ( <i>n</i> = 151) (Group 2)	NGO ( <i>n</i> = 36) (Group 3)			
	<i>Mean (SD)</i>					
Program planning	4.47 (0.48)	4.42 (0.44)	4.44 (0.43)	2, 344	0.463	0.630
Program implementation	4.46 (0.48)	4.43 (0.44)	4.39 (0.46)	2, 344	0.399	0.672
Communication skills	4.51 (0.43)	4.47 (0.43)	4.51 (0.33)	2, 344	0.319	0.727
Educational and informational technology	4.45 (0.51)	4.38 (0.54)	4.28 (0.41)	2, 344	1.867	0.156
Program evaluation	4.42 (0.47)	4.34 (0.51)	4.32 (0.44)	2, 345	1.472	0.231
Personal and professional development	4.61 (0.44)	4.56 (0.46)	4.47 (0.52)	2, 345	1.432	0.240
Diversity	4.51 (0.47)	4.37 (0.49)	4.52 (0.52)	2, 345	3.954	0.020 <sup>a</sup>
Technical subject matter expertise	4.55 (0.48)	4.40 (0.50)	4.36 (0.59)	2, 345	4.819	0.009 <sup>b</sup>

*Note.* DOA = Department of Agriculture, DLS = Department of Livestock Services, NGO = Non-Governmental Organization; Significant differences between groups <sup>a</sup> = 1 > 2, 2 < 3; <sup>b</sup> = 1 > 2, 1 > 3.

### 3.6.3.2 Educational level

The descriptive statistics were calculated for perceptions of the importance of core competencies by respondents' highest level of education. Respondents holding postgraduate degrees rated six of the eight core competencies higher than did the other two groups—i.e., those

holding bachelor's or having intermediate levels of education (Table 3.6). The postgraduate degree holders gave the highest ratings for program planning ( $M = 4.56$ ,  $SD = 0.44$ ), program implementation ( $M = 4.51$ ,  $SD = 0.45$ ), communication skills ( $M = 4.57$ ,  $SD = 0.38$ ), personal and professional development ( $M = 4.63$ ,  $SD = 0.43$ ), diversity ( $M = 4.51$ ,  $SD = 0.48$ ) and technical subject matter expertise ( $M = 4.53$ ,  $SD = 0.50$ ; see Table 4). Undergraduate degree holders gave the highest ratings to education and information technology ( $M = 4.47$ ,  $SD = 0.46$ ) and program evaluation ( $M = 4.44$ ,  $SD = 0.50$ ).

Table 3.6 One-way ANOVA results showing differences in perceptions of importance of core competencies by education

Core competency	Educational level			<i>df</i>	<i>F</i> value	<i>p</i> value
	I. Sc. Ag. or equivalent ( <i>n</i> = 127) (Group 1)	B. Sc. Ag. or equivalent ( <i>n</i> = 82) (Group 2)	Postgraduate ( <i>n</i> = 134) (Group 3)			
	<i>Mean (SD)</i>					
Program planning	4.36 (0.46)	4.38 (0.48)	4.56 (0.44)	2, 340	7.316	0.001 <sup>a</sup>
Program implementation	4.36 (0.47)	4.46 (0.43)	4.51 (0.45)	2, 340	3.734	0.025 <sup>b</sup>
Communication skills	4.42 (0.47)	4.48 (0.47)	4.57 (0.38)	2, 340	4.085	0.018 <sup>b</sup>
Educational and informational technology	4.32 (0.58)	4.47 (0.46)	4.46 (0.46)	2, 340	3.207	0.042 <sup>c</sup>
Program evaluation	4.28 (0.52)	4.44 (0.50)	4.42 (0.45)	2, 340	3.556	0.030 <sup>c</sup>
Personal and professional development	4.50 (0.49)	4.60 (0.45)	4.63 (0.43)	2, 341	2.852	0.059 <sup>b</sup>
Diversity	4.35 (0.50)	4.50 (0.46)	4.51 (0.48)	2, 341	4.374	0.013 <sup>c</sup>
Technical subject matter expertise	4.38 (0.52)	4.50 (0.49)	4.53 (0.50)	2, 341	3.014	0.050 <sup>b</sup>

*Note.* I. Sc. Ag. = Intermediate in Science in Agriculture, B. Sc. Ag. = Bachelor in Science in Agriculture; Significant difference between groups: <sup>a</sup> = 1 < 3, 2 < 3; <sup>b</sup> = 1 < 3; <sup>c</sup> = 1 < 2, 1 < 3.

One-way ANOVA statistics show significant differences in ratings on the importance of core competencies for all competencies among respondents with different educational qualifications: program planning,  $F(2, 340) = 7.316, p < .01$ ; program implementation,  $F(2, 340) = 3.734, p < .05$ ; communication skills,  $F(2, 340) = 4.085, p < .05$ ; education and information technology,  $F(2, 340) = 3.207, p < .05$ ; program evaluation,  $F(2, 340) = 3.556, p < .05$ ; personal and professional development,  $F(2, 341) = 2.852, p < .05$ ; diversity,  $F(2, 341) = 4.374, p < .05$ ; and technical subject matter expertise,  $F(2, 341) = 3.014, p < .05$ . The post-hoc analyses using LSD illustrate that the perceived importance of all core competencies by respondents with postgraduate degrees was higher than that of respondents with intermediate degrees or 12 years of education. Differences were also found between undergraduate and postgraduate degree holders in ratings of program planning. Ratings for undergraduate degree holders and those with intermediate degree holders differ on educational and informational technology, program evaluation, and diversity.

### **3.6.3.3 Undergraduate college and/or university**

One-way ANOVA was calculated to examine whether respondents' perceptions of the importance of core competencies differed between and among respondents who attended for their undergraduate or basic agricultural education one of three groups of educational institutions—Tribhuvan University (TU) and college(s) such as Institute of Agricultural and Animal Science and Agricultural Forestry University (AFU); Purbanchal University (PU) and affiliated college(s) including the Himalayan College of Agricultural Science and Technology (HICAST) and other non-TU and non-AFU colleges in Nepal; and universities outside Nepal. The findings show that there were no significant differences in ratings of perceived importance

between and among respondents who graduated from the aforementioned three groups of higher education (Table 3.7).

Table 3.7 One-way ANOVA results showing differences in perceptions of levels of importance by undergraduate college/university

Core competency	Undergraduate college/university			<i>df</i>	<i>F</i> value	<i>p</i> value
	TU-IAAS and AFU  ( <i>n</i> = 245)	PU- HICAST and other colleges* in Nepal ( <i>n</i> = 49)  <i>Mean (SD)</i>	Colleges outside Nepal  ( <i>n</i> = 41)			
Program planning	4.45 (0.45)	4.34 (0.50)	4.50 (0.46)	2, 333	1.526	0.219
Program implementation	4.45 (0.45)	4.34 (0.48)	4.49 (0.45)	2, 333	1.523	0.220
Communication skills	4.51 (0.43)	4.37 (0.50)	4.52 (0.36)	2, 334	2.325	0.099
Educational and informational technology	4.41 (0.49)	4.36 (0.66)	4.51 (0.42)	2, 333	0.974	0.379
Program evaluation	4.38 (0.49)	4.26 (0.53)	4.57 (0.44)	2, 334	1.674	0.189
Personal and professional development	4.57(0.44)	4.55 (0.58)	4.65 (0.34)	2, 334	0.592	0.554
Diversity	4.46 (0.48)	4.33 (0.53)	4.54 (0.42)	2, 334	2.289	0.103
Technical subject matter expertise	4.48 (0.49)	4.40 (0.53)	4.48 (0.51)	2, 334	0.468	0.626

*Note.* TU = Tribhuvan University, IAAS = Institute of Agricultural and Animal Science, PU = Purbanchal University, HICAST = Himalayan College of Agricultural Science and Technology  
\*Other colleges refer to colleges in Nepal other than affiliated to TU and AFU.

### 3.6.3.4 Age

The data were analyzed to examine what perception respondents of different ages hold and whether there is any difference in their perceptions of the importance of core competencies by age. The youngest age group (35 or younger) and the oldest (51 or older) gave similar ratings of importance ( $M = 4.45$ ) for program implementation. For the other seven core competencies,

youngest age group gave the highest ratings; between three age groups, however, the one-way ANOVA results show no significant differences in ratings of importance for core competencies between three age groups (Table 3.8).

Table 3.8 One-way ANOVA results showing differences in perceptions of the importance of core competencies by age group

Core competency	Age group			<i>df</i>	<i>F</i> value	<i>p</i> value
	≤ 35 years ( <i>n</i> = 72)	36-50 years ( <i>n</i> = 119)	≥ 51 years ( <i>n</i> = 150)			
	<i>Mean (SD)</i>					
Program planning	4.55 (0.46)	4.43 (0.51)	4.41 (0.42)	2, 338	2.371	0.095
Program implementation	4.45 (0.45)	4.42 (0.52)	4.45 (0.41)	2, 338	0.190	0.827
Communication skills	4.56 (0.43)	4.44 (0.51)	4.50 (0.37)	2, 338	1.609	0.202
Educational and informational technology	4.47 (0.44)	4.39 (0.56)	4.39 (0.51)	2, 338	0.647	0.525
Program evaluation	4.47 (0.46)	4.31 (0.53)	4.37 (0.46)	2, 339	2.381	0.094
Personal and professional development	4.61 (0.47)	4.56 (0.53)	4.56 (0.39)	2, 339	0.369	0.691
Diversity	4.54 (0.43)	4.40 (0.58)	4.44 (0.42)	2, 339	2.022	0.134
Technical subject matter expertise	4.56 (0.42)	4.42 (0.60)	4.45 (0.45)	2, 339	1.912	0.149

### 3.6.3.5 Experience in extension profession

The descriptive statistics show that the newer respondents—those with nine or fewer years of experience—considered the competencies of highest importance to their work to be program planning ( $M = 4.56$ ,  $SD = 0.45$ ), communication skills ( $M = 4.55$ ,  $SD = 0.46$ ), education and information technology ( $M = 4.48$ ,  $SD = 0.45$ ), program evaluation ( $M = 4.47$ ,  $SD = 0.46$ ), diversity ( $M = 4.51$ ,  $SD = 0.50$ ), and technical subject matter expertise ( $M = 4.56$ ,  $SD = 0.47$ ) (see Table 3.9). The 10- to 19-year group rated the highest rating to personal and professional development ( $M = 4.69$ ,  $SD = 0.37$ ). The most experienced group (30 years and more) gave the



highest ratings to program implementation ( $M = 4.51$ ,  $SD = 0.39$ ). However, the only difference found among the four groups on one-way ANOVA was for program planning only,  $F(3, 320) = 2.654$ ,  $p < .05$ . The post-hoc analysis using LSD shows that the least experienced group rated program planning significantly higher ( $M = 4.56$ ,  $SD = 0.45$ ) than did the 20-29 year experience group ( $M = 4.37$ ,  $SD = 0.48$ ).

Table 3.9 One-way ANOVA results showing differences in perceptions of importance of core competencies by experience in extension services

Core competency	Extension experience				<i>df</i>	<i>F</i> value	<i>p</i> value
	$\leq 9$ years ( $n = 78$ )	10-19 years ( $n = 41$ )	20-29 years ( $n = 117$ )	$\geq 30$ years ( $n = 88$ )			
	(Group 1)	(Group 2)	(Group 3)	(Group 4)			
	<i>Mean (SD)</i>						
Program planning	4.56 (0.45)	4.42 (0.53)	4.37 (0.48)	4.46 (0.41)	3, 320	2.654	0.049 <sup>a</sup>
Program implementation	4.47 (0.45)	4.41 (0.53)	4.41 (0.46)	4.51 (0.39)	3, 321	0.984	0.401
Communication skills	4.55 (0.46)	4.50 (0.39)	4.43 (0.48)	4.54 (0.37)	3, 320	1.678	0.172
Education and informational technology	4.48 (0.45)	4.37 (0.51)	4.38 (0.52)	4.39 (0.56)	3, 320	0.751	0.523
Program evaluation	4.47 (0.46)	4.37 (0.50)	4.31 (0.50)	4.43 (0.44)	3, 321	2.032	0.109
Personal and professional development	4.61 (0.52)	4.69 (0.3)	4.54 (0.50)	4.57 (0.38)	3, 321	1.228	0.300
Diversity	4.51 (0.50)	4.48 (0.53)	4.42 (0.45)	4.44 (0.44)	3, 321	0.714	0.544
Technical subject matter expertise	4.56 (0.47)	4.50 (0.53)	4.41 (0.55)	4.47 (0.45)	3, 321	1.443	0.230

Note. <sup>a</sup> Significant difference between group 1 > 3.

### 3.6.3.6 Current position

The one-way ANOVA results show difference in perceptions of importance for program planning only. The post-hoc analysis using LSD show that the DADO and DLSO chief's ratings of program planning ( $M = 4.58$ ,  $SD = 0.40$ ) were significantly higher,  $F(3, 341) = 3.403$ ,  $p < .05$  than those of the SMSs and technical officers ( $M = 4.42$ ,  $SD = 0.47$ ) (Table 3.10). No differences were found in ratings for other core competencies by the respondent's current position.

Table 3.10 One-way ANOVA results showing differences in perceptions of importance of core competencies by current position

Core competency	Current position			<i>df</i>	<i>F</i> value	<i>p</i> value
	DADO and DLSO chiefs ( <i>n</i> = 66)	SMSs/TOs ( <i>n</i> = 244)	NGO-POs ( <i>n</i> = 34)			
	<i>Mean (SD)</i>					
Program planning	4.58 (0.40)	4.42 (0.47)	4.44 (0.43)	2, 341	3.403	0.034 <sup>a</sup>
Program implementation	4.55 (0.39)	4.43 (0.46)	4.39 (0.47)	2, 341	2.180	0.115
Communication skills	4.56 (0.39)	4.49 (0.44)	4.51 (0.33)	2, 341	0.850	0.428
Educational and informational technology	4.50 (0.43)	4.42 (0.52)	4.28 (0.40)	2, 341	2.101	0.124
Program evaluation	4.45 (0.44)	4.37 (0.50)	4.34 (0.45)	2, 342	0.870	0.420
Personal and professional development	4.65 (0.39)	4.58 (0.44)	4.47 (0.54)	2, 342	1.884	0.154
Diversity	4.52 (0.44)	4.42 (0.49)	4.51 (0.52)	2, 342	1.438	0.239
Technical subject matter expertise	4.52 (0.48)	4.48 (0.49)	4.37 (0.60)	2, 342	1.010	0.365

*Note.* SMSs = Subject Matter Specialists, TOs = Technical Officers, NGO-POs = Non-governmental Organization Program Officers

<sup>a</sup> Significant difference between chiefs and SMS/TOs.

To further know whether and how perceptions of technical officers, who comprised almost 40% of the respondent, one-way ANOVA was calculated with current position—DADO

or DLSO chiefs, SMSs, TOs and NGO-POs—as independent variables and index scores on perception ratings for importance of eight core competencies as dependent variable. The results demonstrated that except for communication skills, program evaluation, diversity and technical subject matter expertise in which the differences were not significant, for the rest four core competencies technical officers rated significantly lower than either chiefs or subject matter specialists (see Table 3.12 in Appendices).

### 3.6.3.7 Gender

Table 3.11 T-tests showing differences in perceptions of importance of core competencies by gender

Core competency	Gender		<i>t</i> value	<i>df</i>	<i>p</i> value
	Female ( <i>n</i> = 24) <i>Mean (SD)</i>	Male ( <i>n</i> = 324) <i>Mean (SD)</i>			
Program planning	4.55 (0.45)	4.43 (0.46)	1.169	346	0.243
Program implementation	4.57 (0.42)	4.43 (0.46)	1.407	346	0.160
Communication skills	4.63 (0.39)	4.48 (0.44)	1.553	346	0.121
Educational and informational technology	4.67 (0.40)	4.39 (0.51)	2.662	346	0.008
Program evaluation	4.57 (0.43)	4.3 (0.49)	2.024	347	0.044
Personal and professional development	4.68 (0.34)	4.57 (0.47)	1.211	347	0.227
Diversity	4.68 (0.50)	4.43 (0.48)	2.473	347	0.014
Technical subject matter expertise	4.65 (0.31)	4.45 (0.51)	2.822	33.393	0.008

The descriptive statistics show that female respondents' ratings of all core competencies were higher than those of males. The independent sample *t*-tests comparing the mean ratings of males and females showed significant differences in ratings of the importance of four core competencies—education and information technology,  $t(346) = 2.662, p < .05$ ; program

evaluation,  $t(347) = 2.024, p < .05$ ; diversity,  $t(347) = 2.473, p < .05$ ; and technical subject matter expertise,  $t(33) = 2.822, p < .05$  with higher ratings from females than males (Table 3.11).

Independent  $t$ -tests were calculated to know the ratings for which individual competencies differed by respondents' gender. Within educational and informational technologies, the competencies that female respondents rated to be of significantly higher importance than did their male counterparts were use of Microsoft Excel, use of Microsoft Word, use of computers for emails and web browsing, and use of mobile phones for SMSs and texts. Further, within program evaluation females gave significantly higher ratings to conducting monitoring and evaluation (M & E), designing evaluation instrument for M & E, and using qualitative and quantitative techniques and tools for M & E.

### **3.7 DISCUSSION**

Extension professionals in Nepal are predominantly middle-aged males with two decades, on average, of experience in extension service. The non-governmental extension professionals are proportionately younger, mostly female, and better educated but less experienced in extension than governmental extension professionals. One of the strengths of Nepal extension services is extension professionals with an average of 20 years' experience. This is three times the experience of extension professionals in Malaysia and Ethiopia, where professionals had on average seven years' experience (Belay & Abebaw, 2004; Teh, 1980). Nepal can and should explore on what areas extension professionals are stronger at and utilize their experience to strengthen its extension services. They would be of little use if they have not updated themselves with the new knowledge and information.

Respondents perceived all core competencies to be important or very important to their work. Such a finding underscores the need for extension staff members to have core competencies to strengthen demand-driven, participatory, pluralistic, and sustainable extension services in Nepal. The findings are consistent with those of Ghimire and Martin (2011) in the U.S. and those of Okwoche et al. (2011) and Lopokoityit et al. (2013) in Africa. The findings also agree with those of Namdar et al. (2010) in Iran, who found that agricultural extension instructors in Iran rated as very important all core competencies—including subject matter expertise, presentation skills, and adult learning principles. Okwoche et al. (2011) reported that adult learning, communication skills, subject matter expertise and program evaluation skill were all important to the work of extension staff. As reported by Movahedi and Nagel (2012), findings on educational and informational technologies—i.e., perceptions of Nepalese extension professionals on ICTs including computer use and e-learning—are compatible with those of extension agents in Iran. Therefore, it can be said that Nepalese extension professionals hold similar values and perceptions of core competencies to those of their counterparts across the developing world.

Though program evaluation was rated to have importance it received the lowest rating. This discloses that program evaluation is not a priority program in extension services in Nepal. It supports my observation of extension professionals in Nepal who think that once programs are delivered they result into positive outcome and impact. This is and will never be the case because delivering program does not guarantee that programs would be successful. Specifically, for services like extension, which work with many different stakeholders and serve users, most of whom are poor, vulnerable and at risk, program should be evaluated at each step to know how effective programs have been and what outcomes and impact they have resulted into.

The DOA professionals perceived technical subject matter expertise to be more important to their work than did DLS and NGO professionals. This makes us look at their clientele, their working organizations, and their work. The DOA professionals deal with almost all agricultural commodities except livestock and poultry. Furthermore, Nepal has one of the lowest agricultural productivity in Asia. Experts attribute this state of affairs to weaknesses in technical aspects of agriculture, especially weak technical competency of field workers (GON, 2015). The DOA has the mandate to disseminate technologies and help improve agricultural productivity. These could be why DOA respondents indicated that technical subject matter expertise were important to them. Higher rating to technical expertise competency could also be due to DOA respondents being technocentric, i.e. believing on and promoting technical solutions to agricultural problems.

NGO and DOA professionals rated significantly higher to diversity than DLS professionals did. This is in line with Swanson and Sammy (2002) who observed that NGOs' focus more on social and community mobilization for which knowledge of diverse client groups is required. Perceiving diversity as of high importance by DOA people could be an indication that they are transforming to being more inclusive and diverse in their services.

Agricultural education and training are keys to extension workers acquiring knowledge, skills, and competencies. This point is illustrated by differences in perceptions according to their educational level among respondents for all but one (i.e., personal and professional development) core competency. Such findings contrast with those of Burke (2002), who found that respondents' educational level had no influence on their ratings of importance. Respondents with intermediate or 12 years of education perceived core competencies to be less important to their work than did other respondents with higher education. Most technical officers in Nepal are the graduates of the Council for Technical Education and Vocational Training (CTEVT). The Asian

Development Bank (ADB, 2014) mentioned poor infrastructure, lack of monitoring and evaluation, and un- or under-trained trainers affecting education and training quality in CTEVT in Nepal. One reason for these lower ratings could be the lack of exposure of respondents from CTEVT to extension education, including core competencies.

DADO and DLSO chiefs rated relatively higher all core competencies, but significant differences were found in their ratings for program planning with other two groups. The DLSO and DADO chiefs perform managerial and coordinating roles; they are equally involved in extension program planning. These could be why they perceived core competencies to be higher important. Oppositely, technical officers visit fields and interface farmers more than others do and their understanding of importance of core competencies is very vital. On the contrary, technical officers' ratings to four core competencies: program planning, program implementation, educational and informational technology, and personal and professional development were lower than that of chiefs or subject matter specialists. The findings show that extension services in Nepal are still top-down, and centralized. It raises serious doubt about the effectiveness of field extension services. Most technical officers are promoted technicians based on their work experience and they lack basic education required for their current position. The finding indicates that promoting staff members without required education and training may not serve the purpose of institutions and may rather be counterproductive because staff members are unprepared to deliver the services they have to do. The finding that ratings for program planning are significantly higher for chiefs than SMS/technical officers is however consistent with Namdar et al. (2010), but it contrasts Burke (2002), who reported no differences in competency ratings by extension worker's positions.

Female respondents perceived education and information technology, program evaluation, diversity, and technical subject matter expertise to be more important to their work than did their male colleagues. Monitoring and evaluation (M & E) are essential for effective and efficient running of any businesses and services. National reports and dossiers emphasize M & E of extension services, but often M & E are ritual and rhetorical and are not done systematically. As a result, the findings are biased and the recommendations are of little use. Scholar has highlighted the need for unbiased evaluation of overall extension services (Suvedi, 2011). Because of difficult terrain in working areas and difficulty in traveling in the field, females stay or are asked to stay at their offices and do program planning, provide advisory services to clients and write reports. These activities demand competency in the use of information and communication, technologies (ICTs), including computer use. These contexts could have triggered females to rate higher the four core competencies mentioned above. The findings of differences in perceptions of competencies by gender counter Burke (2002), but support Okwoche et al. (2011).

It is a common belief that people become experienced with age and gain more knowledge, and their perceived importance of the traits required for their work goes up. The finding in this study does not support this thesis and no significant difference was found in perceptions by age group. However, the findings are in line with those of Burke (2002). It is surprising to find to have found no difference in perceptions by experience in extension services. This contradicts Brodeur et al. (2011), who indicated that extension workers' perceptions of competencies change with age and experience; he suggested that training needs change as workers gain more experience.



### **3.8 CONCLUSIONS**

The goal of this study has been to determine perceptions of importance of process skills and core competencies among extension professionals in Nepal. The study also sought to examine whether and how extension professionals' ratings of perceived importance of extension core competencies differ by their demographics. The study employed in-person and web surveys.

This study is an important step in extension human resource development for Nepal. Besides examining extension professionals' opinions of extension process skills, the study ascertained the demographic characteristics—education, age, experiences in extension, current position, undergraduate college, gender—of extension workers, which Nepal did not have.

Extension professionals in Nepal are middle-aged, educated and experienced, having over two decades of experience working in extension services. Having staff members with such a lengthy experience is a unique attribute extension services in Nepal have. If such human resources are skillful and capable to perform their roles, it could be a strength as well as an opportunity for extension management to revive its extension services.

Extension professionals perceived core competencies as being important or very important to their work. This undermines critiques that extension professionals in Nepal are technocentric and may value little such things as process skills. If provided with proper training and working environments, extension professionals can effectively serve their clientele. Their higher ratings to importance on extension core competencies are indications of their being positive to extension profession.

Program evaluation received the lowest ratings of importance. This could be attributed to extension workers' limited exposure to and knowledge of program evaluation. Many developing countries—Nepal among them—are lacking in systematic evaluation of extension services. They

seldom carry out systematic evaluation of their programs. The findings show that extension professionals too perceive evaluation as not that important. It may be the indication that they need training and orientation on program evaluation.

The highest rating was given to personal and professional development. This suggests that extension professionals would like to continue to attain training and further their knowledge, skills, and abilities to work better and pursue extension services as their career path. Further, extension professionals tended to hold positive attitudes toward their work—a strength of which Nepalese extension services should be proud.

Perceptions of extension professionals differed by gender and education level, but not by their under graduate college/university, experience in extension, age and the current position. Higher ratings on importance of core competencies by female extension workers is good for extension services. Yet it is not known why did women respondents rated higher to most competencies and it needs to be examined. Is it because they were deprived of the learning opportunities, and therefore deemed these competencies to be important? Or perhaps they have had more exposure and are more aware of the importance of the core competencies, thus motivating them to rate these core competencies more highly.

Education appears to have significant bearing on extension professionals' perceptions. Technical officers and their perceptions would have significant bearing on extension services given their direct contact with and service to farmers. To be effective, extension services require all of their extension professionals, including technical officers, to be competent and motivated.

Attitude is one of the critical traits for human competency (Mulder et al., 2011) and individual attitudes and values are attributed to workers' performance and competency (Ensle, 2005). The demand-led extension approach requires extension workers to be positive to their

profession and be supportive and accountable to end-users. Within this context, the higher ratings for perceived importance for core competencies by respondents is very inspiring.

Extension management in Nepal should utilize this strength to boost its services.

### **3.9 RECOMMENDATIONS**

The following recommendations are made to help strengthen Nepal's extension services.

- Agricultural universities, colleges, and training institutions should review their current extension education curricula to include the core competencies and competencies deemed important in the study.
- Extension management should conduct regular needs assessments and solicit perceptions of extension professionals to determine training needs to keep up with advancing science and technologies and new issues related to climate change, food security, globalization and sustainability.
- Conduct a core competency education campaign. Provide training and education on core competencies as a regular basis. This has to be started with a “training of trainer.” The training should include both extension professionals who work in the field and extension educators who serve in the educational institutions and teach extension education courses.
- Conduct extension training and education programs on core competencies targeting technical officers who lack undergraduate education. This study would suggest six-month training on theoretical aspects of extension in colleges or universities or central training centers followed by one year on the job orientation.
- Conduct an awareness campaign about core competencies among farmers and agricultural stakeholders. Provide orientations on core competencies to senior and policy-level people in the departments and ministry as well.

- Involve women technicians and extension professionals in the extension campaign on core competencies. Provide them necessary trainings and mobilize them to train newer and additional staff members.

## **APPENDICES**

## Appendix A. Assessment of Core Competencies of Agricultural Extension Professionals in Nepal 2015

### Instructions

Core competencies are basic sets of knowledge, skills, abilities, and behaviors that agricultural extension professionals require to perform their tasks well. Core competencies help extension professionals serve their clients better. **Please keep this definition in mind while you answer the survey questions.** Also note that combination of these core competencies with technical knowledge and skills allow agricultural professionals to be more effective in addressing clients' needs.

In this study, agricultural development professionals such as District Agricultural Development Office and District Livestock Office chiefs, subject matter specialists (SMSs), Technical Officers, and Agricultural Program Officers working for Non-Governmental Organizations (NGOs) are considered as agricultural extension professionals.

**Please reflect on your current roles and responsibilities as agricultural extension professionals to complete Sections A through H of this questionnaire.**

In the second column, please indicate the importance of these competencies to perform your job. In the third column, please indicate how competent do you feel you are in these competency areas. Please rate the importance and your level of competency on each statement on 1 to 5 scale as explained below:

#### Importance of competency area

- 1 = Not important
- 2 = Somewhat important
- 3 = Average
- 4 = Important
- 5 = Very important

#### Level of competency

- 1 = Very low
- 2 = Low
- 3 = Moderate
- 4 = High
- 5 = Very high

### **A. Program Planning:**

		A01					A02				
	Extension professionals should be:	How important is this competency to your work?					What is your level of knowledge and/or skills to perform this competency?				
		Please check a box (✓) for each statement that best represents your opinion.					Please check a box (✓) for each statement that best represents your opinion.				
		Not important	Some what important	Average	Important	Very important	Very low	Low	Moderate	High	Very high
1	Familiar with the vision, mission and goals of extension service.										
2	Knowledgeable about national agricultural development strategies, programs, and policies.										
3	Able to engage stakeholders to conduct needs assessment and prioritize needs.										
4	Able to allocate resources to address priority needs.										

		A01					A02				
	Extension professionals should be:	How important is this competency to your work?					What is your level of knowledge and/or skills to perform this competency?				
		Please check a box (✓) for each statement that best represents your opinion.					Please check a box (✓) for each statement that best represents your opinion.				
		Not important	Some what important	Average	Important	Very important	Very low	Low	Moderate	High	Very high
5	Able to engage local development partners such as NGOs, women groups, and cooperatives in extension program.										
6	Familiar with government administrative and financial rules and regulations.										

### B. Program Implementation:

		B01					B02				
	Extension professionals should:	How important is this competency to your work?					What is your level of knowledge and/or skills to perform this competency?				
		Not important	Some what important	Average	Important	Very important	Very low	Low	Moderate	High	Very high
1	Coordinate extension program and activities within district and subdistrict level.										
2	Demonstrate teamwork skills to achieve extension results.										
3	Engage local stakeholders in implementing extension program activities.										
4	Demonstrate negotiation skills to reach consensus and resolve conflicts.										
5	Follow participatory decision making model in extension work.										
6	Delegate responsibilities to staff as needed.										
7	Be able to engage women farmers and members of minority groups in extension works.										

### C. Communication Skills:

		C01					C02				
	Extension professionals should be able to:	How important is this competency to your work?					What is your level of knowledge and/or skills to perform this competency?				
		Not important	Some what important	Average	Important	Very important	Very low	Low	Moderate	High	Very high
1	Respect local culture while communicating with clients.										
2	Prepare monthly, quarterly, and annual progress reports of their extension works.										
3	Share success stories and lessons-learned with stakeholders through various media.										
4	Use various communication channels to disseminate information about important extension activities and programs (e.g., farmers' field day, disease and pest epidemics).										
5	Possess good listening skills and listen to all clients and stakeholders.										
6	Demonstrate good public speaking skills.										

### D. Education and Informational Technology:

		D01					D02				
	Extension professionals should be able to use:	How important is this competency to your work?					What is your level of knowledge and/or skills to perform this competency?				
		Not important	Some what important	Average	Important	Very important	Very low	Low	Moderate	High	Very high
1	Microsoft Excel for data entry and data analysis.										
2	Microsoft Word for word processing (e.g., typing, editing, printing) and designing graphics.										
3	Microsoft PowerPoint for making presentations.										
4	Audio-visual aids such as charts, graphs, and puppet shows for teaching and learning.										
5	Mass media like FM radio stations and television channels for communication.										
6	Computers (email, Internet, and webpages) for communication.										
7	Mobile phone services (e.g., texting, SMS service) for communication.										



### E. Program Evaluation:

		E01					E02				
	Extension professionals should be able to:	How important is this competency to your work?					What is your level of knowledge and/or skills to perform this competency?				
		Not important	Some what important	Average	Important	Very important	Very low	Low	Moderate	High	Very high
1	Understand theories and principles of monitoring and evaluation.										
2	Conduct monitoring and evaluation of extension programs.										
3	Develop data collection instruments for monitoring and evaluation of extension works.										
4	Apply qualitative tools and techniques (e.g., focus group discussion, in-depth interview, etc.) to collect evaluation data.										
5	Apply quantitative tools and techniques (e.g., survey, interview, farm data) to collect evaluation data.										
6	Analyze data (qualitative and quantitative), interpret data, and write evaluation report.										
7	Share evaluation reports within their organizations and with stakeholders.										

### F. Personal and Professional Development:

		F01					F02				
	Extension professionals should:	How important is this competency to your work?					What is your level of knowledge and/or skills to perform this competency?				
		Not important	Some what important	Average	Important	Very important	Very low	Low	Moderate	High	Very high
1	Practice principles of good governance (i.e., participation of clients, accountability to clients, transparency).										
2	Show commitment to career advancement (participate in lifelong-learning, in service training programs, professional meeting and conferences).										
3	Apply professional ethics in works, i.e. promote research based recommendation or technology, honesty and integrity.										

		F01					F02				
	Extension professionals should:	How important is this competency to your work?					What is your level of knowledge and/or skills to perform this competency?				
		Not important	Some what important	Average	Important	Very important	Very low	Low	Moderate	High	Very high
4	Follow organizational policies and directives for in-service training and professional development.										
5	Demonstrate positive attitude towards extension work.										

### G. Diversity:

		G01					G02				
	Extension professionals should:	How important is this competency to your work?					What is your level of knowledge and/or skills to perform this competency?				
		Not important	Some what important	Average	Important	Very important	Very low	Low	Moderate	High	Very high
1	Understand that diversity exists within and among clients and stakeholders.										
2	Identify the needs of women, small farmers and minority groups.										
3	Develop extension programs to benefit women farmers.										
4	Engage various social and marginalized groups in extension programs.										
5	Do teamwork with diverse staffs at district and sub-district levels.										

### H. Technical Subject Matter Expertise:

		H01					H02				
	Extension professionals should:	How important is this competency to your work?					What is your level of knowledge and/or skills to perform this competency?				
		Not important	Some what important	Average	Important	Very important	Very low	Low	Moderate	High	Very high
1	Demonstrate that they have basic knowledge in their discipline (e. g, crops, livestock, IPM, etc.).										
2	Understand the new technology being promoted, i.e., what it is, why and how it works.										
3	Be able to educate community members about different types of risks and uncertainties (due to climate change, market fluctuations, and disasters).										
4	Refer to and make use of publications-- journals, research reports, etc.										

		H01					H02				
	Extension professionals should:	How important is this competency to your work?					What is your level of knowledge and/or skills to perform this competency?				
		Not important	Some what important	Average	Important	Very important	Very low	Low	Moderate	High	Very high
5	Demonstrate basic knowledge of agribusinesses, and help entrepreneurship development among extension clientele.										

**Additional Information about Competencies:**

- I. If you feel there are additional competencies that extension professionals need, but are not listed above, please write them in the spaces below.**

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- J. What are the appropriate ways to acquire the above-mentioned core competencies? Please rate each way or mechanism on a scale given below.**

	Ways to acquire core competencies:	Not appropriate	Somewhat appropriate	Appropriate	Very appropriate
1	Through <b>preservice training</b> (e.g., I. Sc., B. Sc., M. Sc.)				
2	Through <b>in-service training</b> (e.g., training offered in Central Agriculture and Livestock Training Centers, Nepal Administrative Staff College, etc.)				
3	Through <b>basic induction training</b>				
4	Through national and international <b>seminars, workshops, webinars</b> , etc.				

- K. If you were to recommend three other activities or programs to enhance core competencies among extension professionals what would those recommendations be?**

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

- L. How long have you served in extension profession? Write total number of years you have served. \_\_\_\_\_**

- M. How long have you worked in your current position, for example, as an Agricultural Extension Officer, Livestock Development Officer, Subject Matter Specialist or Agricultural Program Officer? Write number of years. \_\_\_\_\_**

- N. What is the title of your current position? Select (✓) one that applies.**

\_\_\_\_ District Agricultural Development Office or District Livestock Services Office chief

- ☐ Subject Matter Specialist (SMS)
- ☐ NGO Agricultural Program Officer
- ☐ Other (please specify\_\_\_\_\_)

**O. What is your highest level of education? Select (✓) one that applies.**

- ☐ I. Sc. Ag. or equivalent
- ☐ B. Sc. Ag. or B. V. Sc. & A.H. or equivalent
- ☐ M. Sc. Ag. or M. V. Sc. or equivalent
- ☐ Ph.D.
- ☐ Other (please specify\_\_\_\_\_)

**P. From where did you get your undergraduate education? Select (✓) one that applies.**

- ☐ Tribhuvan University/Institute of Agricultural and Animal Science (TU-IAAS)
- ☐ Purbanchal University/Himalayan College of Agricultural Sciences and Technology (HICAST)
- ☐ Agricultural and Forestry University (AFU)
- ☐ University and/or College in Nepal other than mentioned above
- ☐ University or college outside Nepal

**Q. What is your primary organization? Select (✓) one that applies.**

- ☐ Department of Agriculture
- ☐ Department of Livestock Services
- ☐ Non-Governmental Organization
- ☐ Other (please specify\_\_\_\_\_)

**R. What is your age now (in years)? \_\_\_\_\_**

**S. What is your gender?**

- ☐ Female
- ☐ Male

**Thank you for taking the time to complete this survey.**

## Appendix B. Invitation Letter to Survey Respondents

**FROM:** suvedi@msu.edu via surveymonkey.com

**DATE:** Thursday, September 17, 2015 4:14 PM

**SENT TO:** 304 recipients

**SUBJECT:** Invitation to Participate on a Core Competency Survey of Agricultural Extension Professionals in Nepal

**MESSAGE:**

# Assessment of Core Competencies of Agricultural Extension Professionals in Nepal

Dear Colleague,

We are conducting a study on "**Assessment of the Core Competencies of Agricultural Extension Professionals in Nepal.**" Some of your colleagues have completed the hard copy survey last month. Because you have access to Internet, we would like to invite you to complete the survey online. Your response to this survey will help improve the in-service and preservice training for extension educators in Nepal.

Your participation in this survey is voluntary and your responses will remain confidential. Your privacy will be protected to the maximum extent allowable by law. You may skip any question that you do not want to answer, and you may end your participation at any time.

If you have concerns or questions about this study, please contact me at 01-517-432-0265 or suvedi@anr.msu.edu. If you have questions or concerns about your roles and right as research participant, you may contact the Michigan State University Human Research Protection Program at 517-355-2180, fax 517-432-4503; or irb@msu.edu, or write to IRB, 207 Olds Hall, MSU, East Lansing, MI USA 48824.

It will take about 25 minutes to complete the survey. You may access the survey by clicking on the green highlighted "**Begin Survey**" box below.

Your opinions will be invaluable to draw study conclusions. I hope you participate in the survey.

Sincerely,

**Murari Suvedi, Professor**  
**Ramjee Ghimire, Graduate Student**  
**Department of Community Sustainability**  
**Michigan State University**

[Begin Survey](#)

Please do not forward this email as its survey link is unique to you.

[Opt out](#) of receiving surveys from this sender

Powered by  **SurveyMonkey**

## Appendix C. Reminder Email (1)

**FROM:** suvedi@msu.edu via surveymonkey.com  
**DATE:** Wednesday, September 23, 2015 3:42 PM  
**SENT TO:** 253 recipients  
**SUBJECT:** Gentle Reminder  
**MESSAGE:**

# Assessment of Core Competencies of Agricultural Extension Professionals in Nepal

Dear Colleague,

We invited you to participate in an online survey last week. As of this writing, 17 Agriculture and/or Livestock Development Officers have responded to the survey.

We want to hear from you. We like to hear from all development partners--GOs and NGOs and your feedback will be very valuable in developing recommendations to strengthen agricultural extension services in Nepal. We'd really appreciate your participation. Please note that your participation is voluntary and all response will be anonymous. Only aggregate results will be shared in research reports and publications.

**Click the button "Begin Survey" below to start or continue the survey.**

Thank you for your time and cooperation.

Sincerely,

Murari Suvedi, Professor  
Ramjee Ghimire, Graduate Student  
Michigan State University

[Begin Survey](#)

Please do not forward this email as its survey link is unique to you.  
[Opt out](#) of receiving surveys from this sender

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## Appendix D. Reminder Email (2)

**FROM:** suvedi@msu.edu via surveymonkey.com

**DATE:** Saturday, September 26, 2015 10:56 PM

**SENT TO:** 244 recipients

**SUBJECT:** Second Reminder to Participate in an Online Survey on Assessment of Core Competency for Agricultural Extension Professionals in Nepal

**MESSAGE:**

# Assessment of Core Competencies of Agricultural Extension Professionals in Nepal

Dear Colleague,

We recently invited you to participate in an online survey. As of now, 25 agricultural professionals have responded to the survey.

We would like to hear from you. **Your feedback will be very valuable in developing recommendations to strengthen agricultural extension services in Nepal.** We'd really appreciate your participation. Please note that your participation is voluntary and all responses will remain anonymous. Only aggregate results will be shared in research reports and publications.

**Click the green "Begin Survey" button below to start or continue the survey.**

Thank you for your time and cooperation.

Sincerely,

**Murari Suvedi, Professor**  
**Ramjee Ghimire, Graduate Student**  
**Michigan State University**

[Begin Survey](#)

Please do not forward this email as its survey link is unique to you.  
[Opt out](#) of receiving surveys from this sender

Powered by  **SurveyMonkey**

### Appendix E. Reminder Email (3)

**FROM:** suvedi@msu.edu via surveymonkey.com

**DATE:** Friday, October 02, 2015 6:45 AM

**SENT TO:** 230 recipients

**SUBJECT:** Final Reminder to Participate in an Online Survey on Assessment of Core Competencies of Agricultural Professionals in Nepal

**MESSAGE:**

## Assessment of Core Competencies of Agricultural Extension Professionals in Nepal

Dear Colleague,

We recently contacted you about a survey on "**Assessment of Core Competencies of Agricultural Extension Professionals in Nepal**", but haven't received your responses yet. Your opinion is important to prepare recommendations, which will help strengthen agricultural extension services in Nepal.

**This is the third and final reminder.** This survey will be closed on **October 10, 2015**. You can share your opinions by participating in this survey before the closing date. Your participation is voluntary.

**Click the "Begin Survey" button below to start or continue the survey.**

Thank you for your time and cooperation.

Sincerely,

**Murari Suvedi, Professor**  
**Ramjee Ghimire, Graduate Student**  
Michigan State University

[Begin Survey](#)

Please do not forward this email as its survey link is unique to you.  
[Opt out](#) of receiving surveys from this sender



Table 3.12 One-way ANOVA results showing differences in perceptions of importance by primary organization

Core competency	Current position				df	F value	p value	Post-hoc LSD test
	DADO/ DLSO chiefs (n = 66) (Group 1)	SMSs (n = 111) (Group 2)	NGO- POs (n = 34) (Group 3)	TOs (n =133) (Group 4)				
	Mean (SD)							
Program planning	4.58 (0.40)	4.47 (0.50)	4.44 (0.43)	4.37 (0.43)	3, 340	3.245	0.022	1 > 4
Program implementation	4.55 (0.39)	4.48 (0.45)	4.39 (0.47)	4.38 (0.47)	3, 340	2.620	0.051	1 > 4
Communication skills	4.56 (0.39)	4.54 (0.43)	4.51 (0.33)	4.44 (0.44)	3, 340	1.607	0.188	
Educational and informational technology	4.50 (0.43)	4.50 (0.47)	4.28 (0.40)	4.35 (0.55)	3, 341	3.416	0.018	1 > 3, 1 > 4, 2 > 3, 2 > 4
Program evaluation	4.45 (0.44)	4.44 (0.49)	4.34 (0.45)	4.30 (0.51)	3, 341	2.131	0.096	
Personal and professional development	4.65 (0.39)	4.64 (0.43)	4.47 (0.54)	4.53 (0.44)	3, 341	2.641	0.049	2 > 3, 2 > 4
Diversity	4.52 (0.44)	4.47 (0.48)	4.51 (0.52)	4.38 (0.50)	3, 341	1.598	0.190	
Technical subject matter expertise	4.52 (0.48)	4.50 (0.46)	4.37 (0.60)	4.41 (0.50)	3, 341	2.364	0.071	

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## **CHAPTER 4 HOW COMPETENT ARE AGRICULTURAL EXTENSION PROFESSIONALS IN NEPAL?**

### **ABSTRACT**

Employing a competency-based assessment approach this study seeks to examine the level of core competencies of extension professionals in Nepal. The population consists of agricultural extension professionals working in governmental and non-governmental organizations.

Participating in self-administered (in-person and web) surveys were 349 extension professionals representing extension priority and agricultural commodity focus areas. The researcher-developed and field-tested instrument containing three sections: eight core competencies representing 48 competencies and process skills, additional competencies required, demographic detail was used for data collection. Surveys were conducted from August to September 2015. Data were analyzed using descriptive and inferential statistics—one-way ANOVA, independent *t*-test, and paired *t*-test. The findings revealed respondents perceiving to be moderately competent in extension core competencies—program planning, program implementation, communication skills, education and information technology, program evaluation, personal and professional development, diversity and technical subject matter expertise. Respondents' differed in their perceived levels of competency by current position and by their undergraduate colleges but not by age or experience on extension. Foreign-educated respondents and office chiefs perceived to have higher level of competency than their counterparts. Findings also show that respondents' perceived level of the importance of all core competencies is significantly higher than their perceived level of competency. The findings have several implications for the training of extension educators in Nepal.

*Keywords:* agricultural extension professionals, core competencies, levels of core competencies, gaps in core competencies, Nepal

## **4.1 INTRODUCTION**

The success of extension services is contingent on extension professionals' knowledge, skills and abilities to perform their extension work effectively. Their strategic roles and responsibilities are to educate and support diverse farming communities in their adoption of new and improved agricultural technologies and practices. Because of this, extension professionals should be competent both in their technical areas of works and process skills, i.e., in effectively delivering their knowledge and skills to their clients. Maddy et al. (2002) assert that extension employees “should possess the necessary competencies to anticipate and deliver quality educational programs of relevance and importance to our publics” (p. 1).

Extension is a complex process that involves several actors with diverse interests. Throughout the process, extension professionals play catalytic and/or facilitating roles. Attaining mastery in the extension process is a challenge, but it is essential for extension professionals to be skillful in their extension work to reaffirm their roles in agricultural development. Qamar (2005) argued that, unlike researchers and educators, most of whom work in controlled environments, extension workers work in harsh field conditions with limited facilities and with not so well educated clients. Only trained, motivated, and competent staff members can work and succeed in such difficult conditions.

### **4.1.1 Competencies and Core Competencies**

“Competencies” and “core competencies” are buzzwords in developing training curricula for extension professionals. They refer to human abilities to help provide efficient and effective services and attain individual and organizational goals. Burke (1989) defined competence as the ability to perform at the standards expected of employees. SeEVERS et al. (2007) used the term “core competency” to describe the basic knowledge, skills, attitudes and behaviors that



contribute to workers' excellence in their respective professions (e.g., extension education and extension services). Core competencies are, according to Athey and Orth (1999), Lucia and Lepsinger (1999), and O'Neil et al. (1997), observable human dimensions that are necessary for program success, both individually and organizationally; they are the qualities required at all levels in the workforce. The concept of competencies and core competencies have been used interchangeably, but "core competencies" refer to the broader constructs that "competencies" are attributed to.

The competency of individuals or organizations is directly related to their performance (Linder, 2001; Shim, 2008). A high level of competency leads to higher efficiency in services, better performance, and higher satisfaction among staff members and their clients. Citing Wayne (1997) and highlighting the importance of competency in an organization, Dubois et al. (2004) stressed "no competencies, no outputs, no organization" (p. 21). These points underline the increasing need for a competency-based assessment of a workforce. Competency-based assessments concern the identifying of core competencies and underlying competencies, and examining whether staff members have the desired level of competencies.

#### **4.1.2 Extension Core Competencies**

Because capable human resources facilitate efficient and sustainable use of resources, the effectiveness of extension services depends greatly on the competencies of extension professionals to tap and mobilize resources. Extension professionals with current knowledge and skills who are able to make informed decisions about agricultural systems and carry out their work as planned can make significant contributions to extension services and thus to agricultural development (Qamar, 2005). Further, they need to be flexible and adaptive in their services and be effective planners. Belay and Abebaw (2004) stressed that if extension is to contribute

significantly to agricultural development, it needs workers who are good at communication, technical subjects, and agricultural marketing.

Other roles extension professionals should be able to perform are serving the underserved and fostering collaboration. Smallholders lack access to agricultural technologies and inputs, and they do not have the same education and access to media that other farmers have (Rangekar, 2006). Extension professionals have to be cognizant of the power dynamics and interests of the people they work with and make sure that smallholders and women benefit. Another key to program success is clientele participation in planning and implementation. Axinn (1997) urged that extension workers have to be competent to bring stakeholders, including smallholder farmers, together and foster collaboration such that partners share their knowledge and resources.

The key competency domains extension professionals should have are program planning, program implementation, communication skills, and program evaluation. Belonging to these four domains are, according to Suvedi and Kaplowitz (2016), 32 extension tools that extension professionals must master; these tools include needs assessment, gender integration, focus group discussion, and use of Information Communication Technologies (ICTs). In their review paper, Suvedi and Ghimire (2015) listed additional competency domains—diversity, personal and professional development, technical subject matter expertise, and education and information technology.

Do extension professionals in Nepal have these competencies? Most extension professionals in developing countries were educated under traditional curricula, and they struggle to adapt to and work in changing contexts (Davis, 2015; Swanson, 2008). Typically, a traditional system involves preservice agricultural education courses that focus primarily on technical

specialization such as crops, livestock and veterinary science, and less on process skills such as communication, leadership, adult learning and social mobilization. It is therefore essential to define and periodically assess the level of knowledge, attitudes, skills and abilities of extension professionals. Extension management should then tailor its services as well as education and training of extension professionals accordingly. As little is known about the level of process skills and competencies of extension professionals hold to carry out extension services in Nepal, this study seeks to fill that gap.

#### **4.2 STUDY GOALS AND OBJECTIVES**

The goal of the study is to examine the perceived level of competency among extension professionals in Nepal. Its objectives are to (i) assess the perceived level of competency of core competencies among extension professionals; (ii) determine whether the perceived level of core competency varies with respondents' demographics; and (iii) ascertain the gaps in ratings of perceived level of importance and competency for core competencies among extension professionals.

#### **4.3 SIGNIFICANCE OF THE STUDY**

The findings of the study help strengthen extension services for four reasons. First, by identifying competency levels, the extension management knows who fits where and who needs what orientation and training. Second, a competency profile that this study generates could serve as the basis for performance evaluation. Third, it helps make efficient use of training and education resources because trainees will be selected for training on the basis of their felt educational and informational needs.

#### **4.4 LITERATURE REVIEW**

A review of the literature suggests that there are linear and positive correlations among training for extension professionals, extension professionals' competencies, and extension professionals' as well as their clients' (i.e., farmers') performance. Linder (2001) found a strong relationship between extension managers' perceptions regarding human resource management competencies and their ability to perform human resource management activities. Khalil et al. (2009) reported: "Program planning, implementation and evaluation [competencies] emerged as significant predictors of performance" (p. 444) of extension agents in Yemen. In a study among Korean agricultural extension agents, Chae et al. (2014) found that core competencies such as research and analytical skills, interpersonal skills, strategic instruction, agricultural extension and customer orientation were positively related to agents' performance. Resonating with the above findings are those of Tiraieyari et al. (2010), who conducted similar studies in Malaysia. Movahedi and Nagel (2012) studied the current and desired competencies of agricultural extension and agricultural education undergraduates and found gaps in the level of competency of the two groups. Khalil et al. (2009) found that program evaluation and associated competencies enhance staff members' job performance.

A study by Issahaku (2014) in Ghana showed most competency frameworks and competency-related literature to be guided predominantly by interpersonal relations, communication, and technical knowledge. Issahaku suggested that extension professionals should be given opportunities to identify and plan their own competency development. A study by Wasihun et al. (2013) among Ethiopian extension agents showed that core competency levels of extension agents were lower than their technical competency levels.

According to Dwarakinath (2006) and Urmani and Jain (2010), communication and adult learning are two facets of extension education. Extension professionals need to have knowledge of andragogy, which pertains to helping adults learn. Indeed, among the chief goals of agricultural extension services are helping farmers learn and hastening their adoption of innovations. Hence, extension professionals should have a thorough knowledge of adult learning and communication process and be able to apply them to their extension work.

#### **4.4.1 Core Competencies and Demographics**

##### **4.4.1.1 Education and training**

Training and education—both pre- and in-service—augment learners’ knowledge, skills and abilities. Learning outcomes and the competency of students are affected by student demographics, budget (Eicher, 2006), syllabus and teaching method, curricula (Paudel et al, 2013), interactions and collaboration with national and international colleges and universities (FAO, 1997). It is thus essential to have coordination between Agricultural Education and Training (AET) and Agricultural Extension Services (AES). To identify a potential link between education and extension, it is crucial to understand how and whether extension professionals with different educational levels and who attended different college and universities—in-country or outside—have perceived any gaps in their competency.

##### **4.4.1.2 Service providers: NGOs vs. GOs**

There is growing recognition of non-governmental organizations (NGOs) as AES providers (Rivera & Sulaiman, 2009). What remains a challenge is ensuring that they contribute to meeting national policies and goals and that their staffs are competent enough to serve their clients. Incongruence in services among service providers (e.g., NGOs and GOs) due to capacity differences among their staff members can greatly affect partnerships and service delivery and

thus the pluralistic approach itself. Past research has studied whether GO and NGO extension services yield different outcomes (e.g., productivity; Bhatta, Ishida, Taniguchi, & Sharma, 2008), but no research has investigated whether NGO and GO professionals differ in their level of core competency.

#### **4.4.1.3 Socio-demographics**

People's access to and control over resources vary with their socio-demographics, and that may affect their competencies, too. In a study among county extension agents in Florida, Brodeur et al. (2011) found significant variance in competency needs for new hires and returning extension agents.

Competency needs of extension workers may vary by the workers' current positions. In a study of extension management competency needs of extension professionals (subject matter specialists and field extension workers; private and public extension workers) in Kenya, Lopokoityit et al. (2013) found public extension professionals were perceived as having higher skills in strategic planning, management, and administrative techniques. Notably, Lopokoityit et al. (2013) found managing finances and budgeting to be the weakest area, thus the pressing training needs.

A big issue in extension in developing countries is gender integration. Increased need for and contribution of female extension workers in agricultural development are felt. A few studies examined competencies by extension professionals' gender. In Nigeria, Okwoche et al. (2011) found that if given training and opportunity, female extension agents can perform alike and/or even better than male agents. Lahai et al. (1999) report that the level of awareness, participation, adoption, technical knowledge, satisfaction with the quality of services provided by female agents were relatively higher than those provided by male agents. It indicates that female

workers were more competent at serving their clients than male agents. But, many countries still do not know how competent their female extension workers are at performing their work or whether they are as competent as their male counterparts.

Ghimire and Martin (2011) assessed perceptions of the importance of professional competencies related to needs assessment among extension professionals in the United States. They found gender and education to be significant but weak predictors of determining respondents' perceptions. Other sociodemographic parameters—age and experience in extension services—contributed nothing to the prediction of perceptions. In contrast, McClure et al. (2012) found different competency levels and needs among extension professionals of different program areas and service levels. They pointed out that those with experience of five years or fewer in extension felt the need for training on extension data collection; the more experienced professionals felt the need for training in data analysis.

As extension professionals become experienced, their organizational and individual roles change. Experienced workers have a better understanding of their organizations and their clients. They have better knowledge of their organizational rules and regulations, but since they play more leadership and teamwork roles their level of competencies and needs may vary. The above review suggests that the core competencies for extension professionals are many, vary from place to place, and are contextual. If we are to strengthen extension services, it is essential to examine competency by extension professionals' demographics.

In summary, most core-competency-related studies have been conducted in the United States. Hence, some researchers (Abdullah & Sentosa, 2012) have felt urgency for studies to be conducted in other parts of the world, especially in the East. One country lagging behind in competency studies is Nepal. The only study Nepal conducted was in the 1980s (Robson et al.,

1986), and that was with college students. Since we are entering a new era backed up by advancing science and technologies, farmers expect new innovations and knowledge to boost their farm productivity while addressing burgeoning challenges—diseases, pests, climate change, etc. Therefore, there is a need to have extension professionals who can work with and help people in this challenging yet opportunity-filled era. It is thus imperative, periodically, to assess workers' competencies and know where they are in their competencies, where the gaps are, and what should be done to address those gaps.

#### **4.5 CONCEPTUAL FRAMEWORK**

The competency-based approach of human resource management augments staff and organizational outputs, e.g., goods or services. According to Dubois et al. (2004), the goods and services that staff members offer are the results of their tasks, and tasks are the function of staff members' thoughts, feelings, and actions. According to Mulder (2010) and Queeney (1995) workers such as extension professionals need to have integrated sets of knowledge, skills, abilities and attitudes to be able to effectively deliver services to their clients. The underlying assumption in the study is that having knowledge only is not what matters in extension services; rather, to increase agricultural production and productivity, workers must have process skills and technical competencies that enable them to transfer research-based knowledge and information to their clients.

Core competencies and competencies are causally related to effective and/or superior job performance (Boyatzis, 1982). Because agricultural systems and societal needs and demands are changing, extension professionals need to acquire new knowledge and skills to serve their clients well. Foreseeing future needs is a way to address the gaps and remain competent (Lucia & Lepsinger, 1999). According to Shim (2008), assessment of core competencies is a learning



process that helps extension organizations prepare for the future, adapt to changes and make extension services efficient. “It [competency assessment] can provide a standard for training, development and learning activities for extension professionals clearly and promote continuous learning of extension professionals” (Shim, 2008, p. 106).

O’Neil et al. (1997) argued that a shift from traditional to high performance work that workers such as extension professionals are asked to do in changing contexts involves a new type of behavior and orientation toward a job. Similarly, Swanson (2008) pointed out that, to be able to do new tasks and to undertake new responsibilities, extension professionals need new knowledge and skills that they can acquire through new training and education.

Competency assessment gained momentum after McClelland (1973) posited as a measure of competence, not intelligence, but rather workplace success. According to McClelland (1973), a worker’s intelligence tells little about how he or she works. Specifically, he criticized the college student assessment system, in which intelligence is the only criterion for deciding students’ successes. This study adopts McClelland’s view that we know little about how extension workers work in real field situations by simply looking at the scores on intelligence they secured at the public service entrance exam. This study is thus designed to elicit extension workers’ opinions of their level of competencies on process skills and technical expertise, especially where and in which of their knowledge areas and skills they think they have gaps.

#### **4.6 STUDY METHODS**

This study seeks to assess extension professionals’ level of competency of core competencies. Extension professionals had to self-assess their level of competencies. Self-assessment was used because, according to Tyler (1971), learners’ or staff members’ self-assessments of core competencies help attain individual as well as organizational goals. Tyler

added that adults know their information, knowledge, skills, and ability needs. Surveys are effective for examining opinions, behaviors, and characteristics of a large number of people within a short time (Vaske, 2008); therefore, surveys were used to collect data. This study followed a cross-sectional research design.

The study population consists of extension chiefs, subject matter specialists (SMSs), technical officers (TOs) in District Agricultural Development Offices (DADOs) and District Livestock Services Offices (DLSOs), and agricultural program officers in select agriculture-based Non-Governmental Organizations (NGOs). The sample represented the major agricultural and livestock production areas of Nepal.

Competency list drawn from a literature review and suggested by experts at focus groups were utilized to design the survey instrument. Three focus groups were conducted with extension experts in Nepal to identify competencies required for extension professionals. The final survey (see Appendix A in Chapter 3) contained eight core competencies each of which had 5-7 competencies with a total of 48 competencies. The program planning and communication skills had six statements each; program implementation, educational and informational technology, and program evaluation had seven statements each; and the rest, i.e., personal and professional development, diversity, and technical subject matter expertise had five statements each.

Each competency statement had two parts—importance and level of competency—grounded in a five point Likert type scale designed to examine respondent perceptions. For importance, 1 equated as “not important,” 2 as “somewhat important,” 3 as “average,” 4 as “important,” and 5 as “very important.” For level of competency, 1 equated as “very low,” 2 as “low,” 3 as “moderate,” 4 as “high,” and 5 as “very high.”

The survey instrument also consisted of a section seeking respondents' opinions about additional competencies required to work in extension and ways to acquire competencies. The final section of the instrument sought respondent's demographic information—gender, age, period of work in the extension profession and current position, undergraduate college, and primary organization.

For objective 1, ratings of the perceived level of core competencies were the variables of interest. For objective 2, ratings of the competency of core competencies were the dependent variables and the independent variables were demographic traits—gender, primary organization currently working (DLS, DOA, NGO), undergraduate college (TU and AFU, PU and colleges other than TU and AFU in Nepal, colleges outside Nepal), experience in extension services (years), current position (DADO or DLSO Chief, SMS, Technical Officer, NGO Program Officer), experience in the current position (years), age (years), and educational qualification (I. Sc. Ag. or equivalent, B.Sc. Ag or equivalent, and postgraduate degree (M. Sc. Ag. or Ph.D.)). For objective 3, the perceived level of importance and self-rated level of competency of core competencies were the variables of interest.

#### **4.6.1 Pretesting the Survey Instrument**

The survey was field tested among 22 extension professionals—16 in-person and 6 online—who were not included in the actual study. The researcher met eight respondents from among the preservice respondents—one on one for two individuals and in two groups of three each. The respondents reviewed the instrument and research questions and filled out the instrument with the researcher present. Their feedback was important in examining whether the subjects would interpret and/or understand the questionnaire and whether they would have any

difficulties answering the questions (Wills, 2005). The instrument was modified integrating the feedback received during pretesting and made available in both Nepali and English.

A panel of experts at Michigan State University and extension experts in Nepal reviewed the survey instrument for its content and face validity. Cronbach alpha coefficients calculated post-hoc of eight core competencies ranged from .86 to .94, indicating that the statements were clear and understandable (Table 4.1).

Table 4.1 Reliability coefficients of the core competencies

Core competency	Number of sub-competency statements included in core competency	Reliability coefficient ( $N = 349$ )
Program planning	6	.86
Program implementation	7	.90
Communication skills	6	.86
Educational and informational technology	7	.93
Program evaluation	7	.94
Personal and professional development	5	.87
Diversity	5	.92
Technical subject matter expertise	5	.88

#### 4.6.2 Data Collection and Analysis

The data were collected in August and September 2015 using self-administered and web surveys. In-person survey respondents were free to choose either Nepali or English version as they felt comfortable with. Data were analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive and inferential statistics were calculated. The cut-off point for significance was set at 0.05. Index scores calculated for each core competency were used to examine the overall perceptions of and the differences by respondent's demographic characteristics.

Descriptive and inferential statistics of individual competencies were also calculated and mentioned wherever appropriate.

The details of the study method including data collection, data analysis and limitations are described in the method section of Chapter 3.

## **4.7 STUDY FINDINGS**

### **4.7.1 Study Participants**

Participating in this study were 349 extension professionals. A majority of the respondents were males (93.1%). The mean age of respondents was 45.97. There were slightly more respondents from the Department of Agriculture ( $n = 160$ ) than the Department of Livestock Services ( $n = 152$ ), but only 36 from non-governmental organizations (NGOs). More than one-third of the respondents ( $n = 128$ , 37.2%) had gone through 12 years (I. Sc. Ag. or equivalent) of education, 82 (23.8%) had bachelor's degrees (B. Sc. Ag or equivalent), and 134 (39%) had postgraduate degrees.

A majority of the participants ( $n = 245$ , 73%) were graduates of Tribhuvan University (TU) or Agricultural Forestry University (AFU) in Nepal; 50 (14.9%) were graduates of the Purbanchal University (PU) or other universities within Nepal; and 42 (12.2%) attended colleges outside Nepal. Twelve respondents did not mention their colleges.

Approximately one fifth ( $n = 66$ , 19.1%) were DOA and DLSO chiefs; one-third ( $n = 111$ , 32.2%) were subject matter specialists (SMSs); and 34 (9.7%) were NGO program officers. Technical officers made up of 38.8% ( $n = 134$ ) of the respondents. The mean for how long respondents had been in extension services was 20.32 ( $SD = 10.61$ ) years. More detail on respondents' demographics is provided under the Demographic Attributes of Respondents in section 3.6.1 in Chapter 3.

#### 4.7.2 Perceptions of Level of Core Competencies

Descriptive statistics calculated to examine the levels of core competencies revealed that respondents perceived to have moderate to high level of competencies in all core competencies. As shown in Table 4.2, respondents indicated themselves as having the highest level of competency in personal and professional development ( $M = 3.92$ ,  $SD = 0.69$ ), followed by communication skills ( $M = 3.89$ ,  $SD = 0.64$ ), diversity ( $M = 3.84$ ,  $SD = 0.71$ ), program implementation ( $M = 3.77$ ,  $SD = 0.65$ ), program planning ( $M = 3.66$ ,  $SD = 0.61$ ), and technical subject matter expertise ( $M = 3.64$ ,  $SD = 0.69$ ). Program evaluation received the lowest, though still moderate, ratings ( $M = 3.56$ ,  $SD = 0.73$ ) followed closely by educational and informational technology ( $M = 3.57$ ,  $SD = 0.85$ ).

Table 4.2 Descriptive statistics for perceptions of level of competencies of core competencies

Core competency	Number of sub-competency statements used to compute index score	Mean (SD) ( $N = 349$ )
Program planning	6	3.66 (0.61)
Program implementation	7	3.77 (0.65)
Communication skills	6	3.89 (0.64)
Educational and informational technology	7	3.57 (0.85)
Program evaluation	7	3.56 (0.73)
Personal and professional development	5	3.92 (0.69)
Diversity	5	3.84 (0.71)
Technical subject matter expertise	5	3.64 (0.69)

Note. Scale: 1 = Very low, 2 = Low, 3 = Moderate, 4 = High, 5 = Very high.

The descriptive statistics calculated for individual competencies show eight competencies with 3.48 or lower ratings. The lowest ratings were given to familiarity with government

administrative and financial rules and regulation ( $M = 3.41$ ) followed by computers—the Internet, email, webpages—for communication ( $M = 3.42$ ). The other ten competencies receiving low scores mostly concerned ICT use and program evaluation. Receiving the highest ratings was demonstrating positive attitude towards extension works ( $M = 4.24$ ) followed by good listening skills and preparing report of extension work, both with the same average score of 4.10.

### 4.7.3 Level of Competencies by Demographics

#### 4.7.3.1 Primary organization

One-way analysis of variance (ANOVA) calculated to examine the differences in level of competencies among respondents from three organizations—the DOA, the DLS, and NGOs—show that extension professionals in NGOs have higher level of competency in all but one core competency—personal and professional development (Table 4.3).

Table 4.3 One-way ANOVA results showing differences in perceptions of level of core competencies by primary organization

Core competency	Affiliating organization			<i>df</i>	<i>F</i> value	<i>p</i> value
	DOA ( <i>n</i> = 157)	DLS ( <i>n</i> = 151)	NGO ( <i>n</i> = 36)			
	<i>Mean (SD)</i>					
Program planning	3.66 (0.61)	3.63 (0.63)	3.76 (0.56)	2, 343	0.662	0.516
Program implementation	3.76 (0.66)	3.78 (0.67)	3.75 (0.55)	2, 344	0.043	0.958
Communication skills	3.88 (0.65)	3.88 (0.65)	3.95 (0.54)	2, 343	0.197	0.821
Educational and informational technology	3.58 (0.85)	3.46(0.88)	3.98 (0.64)	2, 342	5.547	0.004 <sup>a</sup>
Program evaluation	3.56 (0.72)	3.52 (0.75)	3.74 (0.65)	2, 344	1.396	0.249
Personal and professional development	3.93 (0.70)	3.89 (0.71)	3.93 (0.55)	2, 343	0.125	0.883
Diversity	3.85 (0.74)	3.80 (0.70)	3.96 (0.65)	2, 344	0.802	0.449
Technical subject matter expertise	3.64 (0.72)	3.61 (0.69)	3.79 (0.50)	2, 344	1.037	0.356

Note. a Significant difference between ratings of NGO with that of GOs, i.e., DOA & DLS.

Respondents in the DLS rated higher to program implementation ( $M = 3.78$ ,  $SD = 0.67$ ).

Ratings from DOA and NGO respondents for personal and professional development were the same ( $M = 3.93$ ). The post-hoc test with LSD show significant difference only in educational and informational technology with NGO professionals surpassing the GO people,  $F(2, 342) = 5.547$ ,  $p < .05$ .

#### 4.7.3.2 Education

Respondents holding postgraduate degree rated all core competencies higher than did the other two groups (Table 4.4).

Table 4.4 One-way ANOVA results showing differences in perceptions of level of core competencies by the level of the highest education

Core competency	Educational level			<i>df</i>	<i>F</i> value	<i>p</i> value
	I. Sc. Ag. or equivalent ( <i>n</i> = 127) (Group 1)	B.Sc. Ag or equivalent ( <i>n</i> = 81) (Group 2)	Postgraduate ( <i>n</i> = 133) (Group 3)			
	<i>Mean (SD)</i>					
Program planning	3.50 (0.61)	3.61 (0.57)	3.86 (0.58)	2, 339	12.351	0.000 <sup>a</sup>
Program implementation	3.66 (0.67)	3.79 (0.58)	3.90 (0.64)	2, 338	4.581	0.011 <sup>b</sup>
Communication skills	3.81 (0.65)	3.88 (0.63)	3.98 (0.63)	2, 339	2.486	0.085
Educational and informational technology	3.19 (0.85)	3.61 (0.83)	3.95 (0.69)	2, 338	29.994	0.000 <sup>c</sup>
Program evaluation	3.40 (0.74)	3.61 (0.66)	3.70 (0.74)	2, 340	5.701	0.004 <sup>d</sup>
Personal and professional development	3.80 (0.75)	3.95 (0.61)	4.02 (0.66)	2, 339	3.415	0.034 <sup>b</sup>
Diversity	3.75 (0.75)	3.85 (0.63)	3.94 (0.70)	2, 340	2.446	0.088
Technical subject matter expertise	3.52 (0.73)	3.66 (0.61)	3.77 (0.67)	2, 340	4.676	0.010 <sup>b</sup>

Note. I. Sc. Ag. required 12 years of education. Significant difference between groups: <sup>a</sup> = 1 < 3, 2 < 3; <sup>b</sup> = 1 < 3; <sup>c</sup> = 1 < 2, 1 < 3, 2 < 3; <sup>d</sup> = 1 < 2, 1 < 3.



One-way ANOVA results and the post-hoc tests using LSD show that level of competency of respondents with postgraduate degrees for six of the eight core competencies—program planning, program implementation, educational and informational technology, program evaluation, personal and professional development and technical subject matter expertise—was significantly higher than that of respondents with 12 years of education. Significant differences were also found in level of competency between respondents with 12 years of education and those with an undergraduate education for educational and informational technology,  $F(2, 338) = 29.994, p < .05$ ; and program evaluation,  $F(2, 340) = 5.701, p < .05$ . Additionally, respondents who held undergraduate degrees rated program planning,  $F(2, 339) = 12.351, p < .05$ , and educational and informational technology,  $F(2, 338) = 29.994, p < .05$ , significantly lower than did respondents with postgraduate degrees.

#### **4.7.3.3 Undergraduate college and/or university**

One-way ANOVA calculated to examine whether level of competencies differed by respondents' undergraduate college or basic agricultural education college or university. The findings show that ratings for level of competency significantly differed between three groups—TU-IAAS/AFU (group 1), PU-HICAST, and other colleges in Nepal other than in the first group (group 2)—and colleges outside Nepal (group 3). This was true for all except two core competencies—educational and informational technology and personal and professional development (Table 4.5). The post-hoc analysis using LSD show the alumni of PU-HICAST and non-TU colleges rated significantly lower than alumni from other two college groups for five core competencies—program planning, program implementation, communication skills,

diversity, and technical subject matter expertise. The TU group rated program evaluation significantly higher than the PU group.

Table 4.5 One-way ANOVA results showing differences in perceptions of level of core competencies by undergraduate college/university

Core competency	Undergraduate college/university			<i>df</i>	<i>F</i> value	<i>p</i> value
	TU-IAAS & AFU ( <i>n</i> = 245)  (Group 1)	PU-HICAST & non-TU colleges/ universities in Nepal ( <i>n</i> = 48) (Group 2) <i>Mean (SD)</i>	University outside Nepal ( <i>n</i> = 41) (Group 3)			
Program planning	3.67 (0.61)	3.43 (0.59)	3.86 (0.56)	2, 332	5.702	0.004 <sup>a</sup>
Program implementation	3.80 (0.64)	3.54 (0.64)	3.90 (0.61)	2, 332	4.274	0.015 <sup>a</sup>
Communication skills	3.94 (0.63)	3.56 (0.63)	4.00 (0.58)	2, 333	8.361	0.000 <sup>a</sup>
Educational and informational technology	3.62 (0.88)	3.38 (0.85)	3.57 (0.62)	2, 331	1.695	0.185
Program evaluation	3.62 (0.73)	3.29 (0.70)	3.58 (0.68)	2, 333	4.434	0.013 <sup>b</sup>
Personal and professional development	3.94 (0.69)	3.76 (0.72)	3.94 (0.62)	2, 332	1.411	0.245
Diversity	3.88 (0.68)	3.55 (0.75)	3.96 (0.70)	2, 232	5.113	0.007 <sup>a</sup>
Technical subject matter expertise	3.69 (0.67)	3.39 (0.72)	3.69 (0.69)	2, 332	3.980	0.020 <sup>a</sup>

*Note.* TU = Tribhuvan University, IAAS = Institute of Agricultural and Animal Science, PU = Purbanchal University, HICAST = Himalayan College of Agricultural Science and Technology  
Significant difference between groups: <sup>a</sup> = 1 > 2, 2 < 3; <sup>b</sup> = 1 > 2.

#### 4.7.3.4 Age

Respondents were categorized into three age groups—35 years and under, 36 to 50 years, and 50 years and above. A one-way ANOVA was conducted to assess whether level of competencies differed by respondents' age. The descriptive statistics revealed no particular trend

of level of competency by age. The only difference was seen in educational and informational technology,  $F(2, 336) = 18.622, p < .05$ , which the youngest group (35 years and younger) rated the highest (Table 4.6).

Table 4.6 One-way ANOVA results showing differences in perceptions of level of competencies by age

Core competency	Age group			<i>df</i>	<i>F</i> value	<i>p</i> value
	≤ 35 years ( <i>n</i> = 71) (Group 1)	36 - 50 years ( <i>n</i> = 119) (Group 2)	≥ 51 years ( <i>n</i> = 149) (Group 3)			
	<i>Mean (SD)</i>					
Program planning	3.66 (0.53)	3.63 (0.66)	3.68 (0.62)	2, 337	0.200	0.819
Program implementation	3.70 (0.57)	3.75 (0.71)	3.81 (0.65)	2, 336	0.731	0.482
Communication skills	3.87 (0.61)	3.85 (0.71)	3.93 (0.60)	2, 337	0.470	0.626
Educational and informational technology	4.09 (0.64)	3.49 (0.89)	3.39 (0.83)	2, 336	18.622	0.000 <sup>a</sup>
Program evaluation	3.68 (0.66)	3.45 (0.82)	3.59 (0.67)	2, 338	2.577	0.078
Personal and professional development	3.97 (0.63)	3.81 (0.77)	3.97 (0.64)	2, 337	2.084	0.126
Diversity	3.86 (0.66)	3.79 (0.77)	3.86 (0.70)	2, 338	0.401	0.670
Technical subject matter expertise	3.70 (0.61)	3.59 (0.79)	3.65 (0.65)	2, 338	0.562	0.571

Note. <sup>a</sup> Significant difference between groups: 1 > 2, 1 > 3.

#### 4.7.3.5 Experience in extension profession

The descriptive statistics calculated for core competency levels with varied experiences in extension do not show any trend (Table 4.7). The one-way ANOVA results show differing levels of competency in educational and informational technology among the four groups,  $F(3, 318) = 15.090, p < .05$ ; and program evaluation,  $F(3, 320) = 2.692, p < .05$ . The post-hoc LSD

tests show that professionals with nine years or less of experience were perceived to have significantly higher levels of competency in educational and informational technology than the other three groups who had served in extension longer and the group with 10 to 19 years of experience also differed (had higher ratings on competency) from the two groups with higher experience in extension. Respondents with 9 years or less experienced rated significantly higher program evaluation than did the group with 20 to 29 years of experience.

Table 4.7 One-way ANOVA results showing differences in perceptions of level of competencies by years of services in extension services

Core competency	Extension experience				<i>df</i>	<i>F</i> value	<i>p</i> value
	≤ 9 years ( <i>n</i> = 77) (Group 1)	10 - 19 years ( <i>n</i> = 41) (Group 2)	20 - 29 years ( <i>n</i> = 116) (Group 3)	≥ 30 years ( <i>n</i> = 87) (Group 4)			
	<i>Mean (SD)</i>						
Program planning	3.71 (0.56)	3.71 (0.68)	3.63 (0.65)	3.65 (0.59)	3, 319	0.321	0.810
Program implementation	3.76 (0.58)	3.86 (0.68)	3.75 (0.70)	3.82 (0.63)	3, 319	0.439	0.725
Communication skills	3.90 (0.62)	3.94 (0.69)	3.82 (0.67)	4.00 (0.57)	3, 319	1.287	0.279
Educational and informational technology	4.08 (0.68)	3.75 (0.73)	3.34 (0.88)	3.42 (0.85)	3, 318	15.090	0.000 <sup>a</sup>
Program evaluation	3.72 (0.69)	3.66 (0.79)	3.44 (0.75)	3.61 (0.69)	3, 320	2.692	0.046 <sup>b</sup>
Personal and professional development	3.99 (0.66)	3.90 (0.75)	3.85 (0.72)	3.97 (0.64)	3, 320	0.852	0.466
Diversity	3.87 (0.70)	3.91 (0.76)	3.78 (0.75)	3.87 (0.66)	3, 320	0.483	0.694
Technical subject matter expertise	3.73 (0.63)	3.77 (0.70)	3.56 (0.73)	3.66 (0.68)	3, 320	1.332	0.264

Note. <sup>a</sup> Significant difference between groups: 1 > 2, 1 > 3, 1 > 4, 2 > 3, 2 > 4.

<sup>b</sup> Significant difference between groups: 1 > 3.

#### 4.7.3.6 Current Position

One-way ANOVA and post-hoc tests calculated for the level of competencies of extension professionals by their current positions show that the DADO and DLSO chiefs perceived to have significantly higher levels of competency than SMSs and technical officers for six core competencies—program planning,  $F(3, 340) = 15.447, p < .05$ ; program implementation,  $F(3, 339) = 11.192, p < .05$ ; communication skills,  $F(3, 340) = 4.584, p < .05$ ; educational and informational technology,  $F(3, 339) = 18.441, p < .05$ ; program evaluation,  $F(3, 341) = 4.299, p < .05$ ; and technical subject matter expertise,  $F(3, 341) = 5.478, p < .001$  (Table 4.8). Similarly, the chiefs' ratings for competency were significantly higher for program planning, program implementation, and educational and informational technology than NGO officers. Additionally, NGO officers rated their competency for educational and informational technology to be significantly higher than SMSs and technical officers.

Table 4.8 One-way ANOVA results showing differences in level of core competencies by current position

Core competency	Current position			<i>df</i>	<i>F</i> value	<i>p</i> value
	DADO/DLSO	SMS/TO	NGO-PO			
	chief	( <i>n</i> = 243)	( <i>n</i> = 34)			
	( <i>n</i> = 64)	(Group 2)	(Group 3)			
	<i>Mean (SD)</i>					
Program planning	4.01 (0.57)	3.56 (0.59)	3.75 (0.57)	2, 340	15.447	0.000 <sup>a</sup>
Program implementation	4.11 (0.58)	3.70 (0.65)	3.73 (0.56)	2, 339	11.192	0.000 <sup>a</sup>
Communication skills	4.09 (0.63)	3.83 (0.65)	3.94 (0.55)	2, 340	4.584	0.011 <sup>b</sup>
Educational and informational technology	4.01 (0.63)	3.41 (0.88)	4.00 (0.63)	2, 339	18.441	0.000 <sup>c</sup>
Program evaluation	3.75 (0.77)	3.49 (0.72)	3.74 (0.67)	2, 341	4.299	0.014 <sup>b</sup>

Table 4.8 (cont'd)

Personal and professional development	4.08 (0.67)	3.88 (0.70)	3.92 (0.56)	2, 340	2.212	0.111
Diversity	3.98 (0.66)	3.79 (0.73)	3.93 (0.64)	2, 341	2.288	0.103
Technical subject matter expertise	3.87 (0.74)	3.57 (0.68)	3.79 (0.52)	2, 341	5.748	0.004 <sup>b</sup>

*Note.* Significant difference between groups: <sup>a</sup> = 1 > 2, 1 > 3; <sup>b</sup> = 1 > 2; <sup>c</sup> = 1 > 2, 2 < 3.

For this analysis, data for technical officers and subject matter specialists were combined because they belonged to the same officer level. However, these staffs follow markedly different career trajectories. On one hand, to be eligible for the SMS position they should have at least an undergraduate degree in agricultural or related subjects. On the other hand, technical officers enter agricultural extension services as Technical Assistants or Junior Technical Assistants and could be promoted after serving for a stipulated period in their profession. Technical officers are not required to have undergraduate education to receive an extension job, but they can pursue an undergraduate degree if the opportunity comes up.

Additional analysis was done separating subject matter specialist and technical officer into two groups and retaining other two groups, i.e., office chief and NGO program officer. The one-way ANOVA results show that except for two core competencies, namely, personal and personal development, and diversity in which there were no differences between groups, technical officers' perceived to have the lowest competency level for remaining six core competencies (see Table 4.11 in Appendix).

#### 4.7.3.7 Gender

The descriptive statistics show females perceived themselves as having higher levels of competency than their male counterparts in four core competencies—program planning ( $M =$

3.72,  $SD = 0.60$ ), educational and informational technology ( $M = 3.96$ ,  $SD = 0.67$ ), program evaluation ( $M = 3.72$ ,  $SD = 0.60$ ), and personal and professional development ( $M = 3.94$ ,  $SD = 0.63$ ); males reported average ratings of the same competencies to be  $M = 3.65$ ,  $SD = 0.61$ ;  $M = 3.54$ ,  $SD = 0.86$ ;  $M = 3.55$ ,  $SD = 0.74$ ; and  $M = 3.91$ ,  $SD = 0.0.69$  (Table 4.9). Males gave higher ratings to the rest of the four competencies.

The independent sample  $t$ -tests showed significant differences between males and females' ratings in educational and informational technology only,  $t = 2.341$ ,  $p < .05$ .

Independent sample  $t$ -tests conducted for ratings for individual competencies by gender revealed females as having higher competency in using Microsoft Excel, Word, PowerPoint, computer for internet and emails and mobile phone—texts, short message service.

Table 4.9 Differences in level of core competencies by gender

Core competency	Gender		$t$ value	$df$	$p$ value
	Female ( $n = 24$ ) <i>Mean (SD)</i>	Male ( $n = 322$ ) <i>Mean (SD)</i>			
Program planning	3.72 (0.60)	3.65 (0.61)	0.488	345	0.626
Program implementation	3.76 (0.53)	3.77 (0.66)	-0.128	344	0.898
Communication skills	3.87 (0.53)	3.89 (0.65)	-0.135	345	0.893
Educational and informational technology	3.96 (0.67)	3.54 (0.86)	2.341	344	0.020
Program evaluation	3.72 (0.60)	3.55 (0.74)	1.118	346	0.264
Personal and professional development	3.94 (0.63)	3.91 (0.69)	0.188	345	0.851
Diversity	3.82 (0.68)	3.84 (0.71)	-0.120	346	0.904
Technical subject matter expertise	3.58 (0.71)	3.64 (0.69)	-0.493	346	0.622

#### 4.7.3.8 Relationships between age and experience in extension and level of competency

The Pearson Product Moment Correlation coefficients were calculated to examine the relationships between independent variables—age, service periods—and dependent variables—ratings for level of competencies for different core competencies. The perceptions for education and information technology were negatively related, though weakly so, to the number of years served in extension profession,  $r = -0.343, p < .001$ ; and age,  $r = -0.341, p < .001$ .

#### 4.7.3.9 Discrepancy between desired and current level of competency

The paired sample *t*-tests were calculated to compare mean ratings of importance of core competencies to the mean ratings for level of competencies and examined whether and how their mean differences differ.

Table 4.10 Paired *t*-tests results of level of importance and level of competency

Core competency	<i>Mean (SD) (N = 346)</i>		Paired difference		<i>t</i> value	<i>df</i>	<i>p</i> value
	Importance	Competence	<i>Mean diff.</i>	<i>SD</i>			
Program planning	4.44 (0.46)	3.66 (0.61)	0.78	0.61	24.025	346	0.000
Program implementation	4.44 (0.45)	3.77 (0.65)	0.67	0.63	19.777	345	0.000
Communication skills	4.49 (0.44)	3.89 (0.64)	0.61	0.59	19.014	346	0.000
Educational and informational technology	4.40 (0.51)	3.57 (0.85)	0.83	0.88	17.649	345	0.000
Program evaluation	4.37 (0.49)	3.56 (0.73)	0.81	0.73	20.690	347	0.000
Personal and professional development	4.58 (0.46)	3.92 (0.69)	0.66	0.64	19.092	346	0.000
Diversity	4.45 (0.48)	3.84 (0.71)	0.61	0.62	18.519	347	0.000
Technical subject matter expertise	4.47 (0.50)	3.64 (0.69)	0.83	0.68	22.726	347	0.000



The descriptive statistics in Table 4.10 show that mean scores for importance for all eight core competencies were higher than that of level of competencies. The paired *t*-tests show that ratings of level of competencies were significantly lower than the ratings for level of importance.

## **4.8 DISCUSSION**

In extension core competencies, respondents felt moderately competent at performing their extension tasks. The highest ratings for personal and professional development indicate that extension professionals feel capable and are willing to work to foster good governance in extension services. They would like to pursue learning and further their knowledge while they work for their organizations. The findings indicate that extension professionals had positive attitudes toward their extension work, a key factor to being a successful worker. The findings are consistent with levels of competency as perceived by cooperative extension professionals in North Carolina (Lakai et al., 2014) and by extension agents in Ethiopia (Wasihun et al., 2013).

Overall, the findings revealed that Nepalese extension professionals feel only moderately competent with process skills or competencies to perform their extension job to the degree expected by their clients. There is room and a need for extension professionals to improve their extension core competency and thus their performance.

The 21<sup>st</sup> century marks an era of accountability and information and communication technology (ICTs). ICTs—text messages, smart phone, the Internet, social media—facilitate quick, cheap, effective and easy communication and transfer of agricultural information among a large group of farmers and audiences (Aker, 2011). Extension professionals have to be cognizant of and able to use these tools in their work. Such a reality makes it worrisome that the lowest ratings among extension workers were for program evaluation, and educational and informational technology on competency.

Public extension services in Nepal and also throughout the developing world, have long been criticized as being rhetorical, top-down, and less effective at serving their clients. The new paradigm for extension services envisions greater roles of NGOs and the private sector in serving extension clients. In this vein, it is encouraging to find that NGO professionals have higher levels of competencies in educational and informational technology. The findings are in agreement with Bhatta et al. (2008), who reported a positive effect of the extension services provided by NGOs in Nepal. They are also in line with Lopokoityit et al. (2013) in Africa where competencies among public extension workers were found to be lower than NGO workers. The findings partially support Mengal et al. (2015) in Pakistan where levels of competency of both private and public extension workers fell short of clients' expectations.

The higher the education level of the respondents the more competent they were perceived to be in core competencies. Respondents with masters and Ph.D. degrees perceived as having higher level of competencies for six core competencies. As revealed by Lakai et al. (2012), the findings indicate that higher level of preservice training is an important avenue for extension professionals to acquire core competencies that they can use in their services. It should be noted, however, that technical officers, most of whom even do not hold undergraduate degrees, do more extension fieldwork and interact with farmers more than their higher educated counterparts.

The findings showing strikingly lower levels of competency among technical officers mean that an appraisal is in order of pre- and in-service training and learning and working environments within the organizations—DOA and DLS—where technical officers work. Questions the findings have raised are as follows: Are technical officers getting opportunities for training and learning to hone their process skills? Are core competencies taught in the pre- and

in-service training that technical officers attend? Majority of the technical officers are either field-based and have experiences working in the field. They are critical human resources to implement national agricultural and extension policies and programs. It appears that low level of competency among technical officers is the crux of the problem for the low level of technology adoption and low agricultural productivity Nepal has been facing.

Respondents' level of competency varied greatly according to the educational institutions they attended for their undergraduate or basic education. The highest ratings for competency were by alumni of non-Nepali colleges and universities. This implies that foreign colleges and universities, which a respondent group ( $n = 43$ ) attended, offered better education in core competencies than did agricultural colleges and universities in Nepal. The reasons for higher core competency level among alumni of non-Nepali colleges could be due to better curricula, better teaching methods, use of better educational materials, and conducive environments. There could be other factors leading to the higher level of competency among alumni of non-Nepali colleges; this calls for further inquiry.

With regard to age, except for educational and informational technology, respondents were perceived to have equal levels of competency regardless of their age. The finding goes against that of Lakai et al. (2014), who found that competency for professional competencies including ICTs increased with age. Higher levels of competency among the youngest respondent group could reflect the greater exposure and opportunities they had to information and communication technologies. The emergence in Nepal of the Internet was not so long ago and older people have likely had less opportunity to learn about ICTs than their younger counterparts. Some younger workers might have attended courses on computer technologies in schools as well and learned about ICTs and other e-tools there.

Experience counts in learning and in providing services. Adult and/or informal learning, which is an integral part of extension education, emphasizes experiential learning among extension professionals. Reasonably, staff members with longer work experiences are supposed to be more skillful and competent in serving their clients. This holds true for extension services as well. This study does not, however, show any such differences in competency among extension workers.

Unlike the other independent variables, current position is found to be a critical factor affecting extension professionals' competencies. DLSO and DADO chiefs perceived to have the highest level of competency for six core competencies. One reason for their being more competent could be their having more education than others—91% of the chiefs hold postgraduate degrees as against 2.3 % technical officers, 43% SMSs and 65% NGO program offices. The findings reinforce the notion that preservice education and training are critical to acquiring competencies. These findings counter Lakai et al. (2014), who reported that overall proficiency levels do not vary with extension agents' job position and program area of responsibility.

With regard to gender, the only difference found was in educational and informational technology where females surpassed males. Females were found to be more competent at using Microsoft programs, computer use including the Internet, email, and mobile phone use, specifically texting. This finding is consistent with Lakai et al. (2014). The findings show that female extension workers in Nepal are more computer-friendly and competent in ICT use than males. The findings also counter the claim by many critics who claim that women workers do not get equal opportunity for learning and are not on par in competency with their male counterparts in work.

Regarding the gap in competency among extension professionals—i.e., differences in perceived level of importance and perceived level of competency—differences were significant, with the existing level of competency being significantly lower than that of the desired level. This suggests that extension professionals have much to work on regarding process skills so that they can become competent enough to properly serve their clients. The highest difference was found in educational and informational technology, and technical subject matter expertise, followed by program evaluation. The findings imply that competencies with higher differences are the areas in which extension workers in Nepal need to be trained. Extension management should focus on providing training and educating extension professionals on various ICTs and their uses in extension, technical subjects, and program evaluation. The higher need for technical subject matter expertise training is consistent with Rigyal and Wangsamun's (2011) study in Bhutan and but contrasts with Conklin et al. (2003) at Ohio State.

The areas standing out as being the least known about were ICT use; familiarity with government administrative and financial rules and regulations; and cognizance of the vision, mission, and goals of extension services. How can we expect effective extension services from extension professionals who do not know what extension's vision, missions, and goals are? How can we expect efficient and accountable extension services from extension human resources who do not know the government rules and regulations?

Demand-driven and bottom-up extension means maintaining transparency in services and extension professionals being accountable to farmers for their services. Communication and program evaluation skills are critical competencies to foster demand-driven services. ICTs are evolving fast. Acquiring information about new technologies and using them in extension will show that extension services is effective and extension workers are innovative. On the contrary,

extension professionals in Nepal perceived to be weak in these two areas indicating that extension services in Nepal is slow in adopting to the changing contexts and to be demand-led.

#### **4.9 CONCLUSIONS**

Agricultural extension services in Nepal have long been criticized for being extension worker-led and weak. Extension human resources, especially extension professionals, are blamed for poor performance. Without empirical studies, it was difficult to tell how capable and competent extension professionals are in their work and whether they need additional training to enhance their workability. Against this backdrop, this study sought to assess the level of core competencies of extension professionals and identify gaps in core competencies, if any.

This study employed the survey method and respondents self-assessed their perceptions. Respondents were mostly males with over 20 years of experience in extension. A majority had undergraduate or postgraduate education. There were almost equal number of respondents from the Department of Agriculture and Department of Livestock Services, but only 10% from NGOs.

This study has not only unveiled the competency of extension professionals, but the demographic data compiled in the study describe who extension workers in Nepal are. Further, study findings appear to be consistent with research studies conducted in both developing and developed countries.

Information and communication technologies (ICTs), including computer use and e-learning, happened to be the weakest areas of extension professionals. The longer a worker has worked in extension, the weaker he/she is in computer and other ICT use. The combination of “experience in extension” and “skills to use ICTs/computer” could have synergistic effect on work performance. This finding warrants training and empowering extension officers on ICTs including computer use.

Foreign-educated extension workers appear to be more competent than in-country-educated workers. One would think this should have been the other way round, given the proximity of and opportunities for colleges to train students in local contexts. Curricula and teaching methods may also have a significant bearing on students' competencies. The findings indicate gaps in the current national agricultural education system; further inquiry is needed.

The office chiefs perceived themselves to be more competent than did SMSs, NGO program officers, and technical officers. The chiefs did have a higher education than the others. The importance of preservice education among extension workers therefore cannot be emphasized enough in extension services. Opportunities for in-service training, study tours, participation in seminars and workshops, which chiefs are privileged with, might also have helped to boost their competencies. If that is the case, other extension workers should also get opportunities to attend seminars, workshops and webinars and learn the process skills.

Technical officers happened to have the lowest level of perceived competency for all core competencies. This is a serious issue Nepal has to urgently examine and address.

There is a noticeable discrepancy, among extension professionals, between the desired and actual levels of competency for core competencies. Respondents perceived the level of importance of all core competencies to be significantly higher than their perceived level of competencies. Core competencies with the highest competency gap—educational and informational technology, technical subject matter expertise and program evaluation—are the areas in which extension professionals in Nepal are in need of training and education.

The findings also suggest a need to examine extension education as well as a training program and its curricula in agricultural colleges and training centers for the inclusion of core competencies. The findings imply that extension professionals in Nepal do not feel they are as

competent as they should be to serve their clients. Please note that self-rated data like that used in this study may need cautious interpretation (Wasihun et al., 2013).

#### **4.10 RECOMMENDATIONS**

Based on the above findings and the discussion, this study puts forward the following recommendations for Nepal agricultural extension management.

- Review and/or redesign the current extension services strategy and policies soliciting suggestions from stakeholders—farmers, educators, researchers, and representatives of the private and NGO sectors—on how to make extension services more effective and extension human resources more efficient. Prepare a plan to utilize the knowledge and skills of the experienced extension workers.
- Conduct core competency training for technical officers and offer them the refresher training on technical subject matters as well.
- Tailor competency trainings to address the specific needs of public and NGO extension workers.
- Review and update the preservice, in-service, basic induction training, and education curricula, integrating findings from this study. Short-term in-service trainings would be helpful in keeping staff member current with the new technologies and emerging needs in extension services, but there needs to be a long-term strategy to develop human resources with required extension core competencies.
- Seek beneficiaries' perceptions of the competencies of extension workers and compare them with the results of this study. If the two results differ greatly, it would be important to examine the factors leading to such differences.



- Provide foundation training on program evaluation to all extension professionals and conduct short-term follow-up and/or refresher training in subject matters.
- Students' learning outcomes and skills are correlated to teachers' teaching skills and competencies. Therefore, train and/or educate trainers at training centers and faculty members in agricultural colleges and universities to teach core competencies.
- Review the agricultural extension education programs of foreign agricultural universities. Study their curricula, teaching methods and tools, and course monitoring and evaluation systems. Establish linkages with foreign colleges and universities and collaborate with them on research and education. It would be rewarding to arrange exchange visits for faculty members and students, communicating regularly using ICTs and participating in professional webinars, and seminars.
- Study the effect of various factors—curricula, trainers' and/or faculty members' teaching skills, inclusion of practical and/or hands-on training, and/or learner-friendly college environments—on levels of core competencies of the college graduates.
- Increasingly use ICTs in extension services and extension education and training. Provide training and orientation to extension workers on ICT use. Design a separate module for older workers and workers with longer experience in extension work to help them learn to use computer programs—Microsoft Word, PowerPoint, Excel and other digital tools—cell phones, the Internet, emails, social media, and so on.

## **APPENDIX**

Table 4.11 One-way ANOVA results showing differences in perceived level of competency between chiefs, subject matter specialists, NGO program officers and technical officers

Core competency	Current position				df	F value	p value	Post-hoc LSD test
	DADO / DLSO chief (n = 65) (Group 1)	SMS (n = 111) (Group 2)	NGO-PO (n = 34) (Group 3)	TO (n = 133) (Group 4)				
	Mean (SD)							
Program planning	4.01 (0.57)	3.65 (0.57)	3.75 (0.57)	3.48 (0.60)	3, 339	12.051	0.000	1 > 2, 1 > 3, 1 > 4, 2 < 3, 2 > 4, 3 > 4
Program implementation	4.11 (0.58)	3.77 (0.63)	3.73 (0.56)	3.64 (0.67)	3, 338	8.321	0.000	1 > 2, 1 > 3, 1 > 4
Communication skills	4.09 (0.63)	3.84 (0.66)	3.94 (0.55)	3.82 (0.64)	3, 339	3.061	0.028	1 > 2, 1 > 4
Educational and informational technology	4.01 (0.63)	3.72 (0.81)	4.00 (0.63)	3.15 (0.85)	3, 338	24.005	0.000	1 > 2, 1 > 4, 2 > 4, 3 > 4
Program evaluation	3.75 (0.77)	3.59 (0.70)	3.74 (0.67)	3.42 (0.73)	3, 343	4.025	0.008	1 > 4, 3 > 4
Personal and professional development	4.08 (0.67)	3.95 (0.66)	3.92 (0.56)	3.82 (0.74)	3, 339	2.198	0.088	
Diversity	3.98 (0.66)	3.83 (0.70)	3.93 (0.64)	3.75 (0.75)	3, 343	1.803	0.146	
Technical subject matter expertise	3.87 (0.74)	3.63 (0.64)	3.79 (0.52)	3.53 (0.70)	3, 343	4.307	0.005	1 > 2, 1 > 4, 2 < 3, 3 > 4

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## **CHAPTER 5 PREDICTIONS OF CORE COMPETENCIES FOR DEMAND-DRIVEN EXTENSION SERVICES IN NEPAL**

### **ABSTRACT**

A self-administered survey was conducted in August and September of 2015 among agricultural extension professionals in Nepal to examine their perceived level of competency for demand-driven extension, to determine the predictors for demand-driven competency and to identify ways to acquire those competencies. The study included 22 competencies contributing to demand-driven extension. Participating in the survey were 349 professionals representing both public and non-governmental sectors. Descriptive statistics, multilinear regression and ordinal logistic regression were used for data analysis. Respondents perceived themselves to have moderate levels of competency for demand-driven extension. Preservice education emerged as the significant predictor of demand-driven core competencies. The higher the educational level, the higher the perceived competency level. Respondents perceived preservice, in-service, basic induction training and workshops/seminars/webinars as appropriate ways of gaining competencies. Compared with NGO professionals, Department of Livestock Services professionals felt that in-service and basic induction training were very appropriate, while the Department of Agriculture professionals felt very appropriate the basic induction training to hone their competency. The findings indicate that extension professionals need training and education to enhance their competencies for demand-driven extension.

*Keywords:* demand-driven extension, competencies attributed to demand-driven extension, perceived level of competency, ways to acquire core competencies, training and education

## 5.1 INTRODUCTION

Developing countries in Asia, Africa and the Caribbean are striving to make agricultural extension services more responsive, efficient and accountable to help meet educational and informational needs of farmers. Specifically targeted are smallholder, marginal and female farmers who lack access to extension services despite their being in dire need of services and facing, for many years now, low agricultural productivity and food insecurity. Denouncing traditional top-down, extension agent-led and supply-driven extension that could not effectively serve the clients who need the services most, scholars have urged extension services to become demand-driven (Rivera et al., 2009). “Demand” refers to what people want, need and value, and are willing to invest their time and money and other resources to acquire (Neuchâtel Group, 2006). The Neuchatel Group states that, to be demand-driven, services should be driven by users’ demands, service providers should be accountable to users, and users should have the freedom to choose from whom they seek services. To provide demand-driven extension services, extension professionals must understand extension approaches and methods and be able to effectively offer extension services that are socially, economically and technically just.

Farming communities are complex. They are made up of commercial, semi-commercial and subsistence operators growing many types of crops and livestock, holding various attitudes and values, and having different information and educational needs. Extension workers are tasked with serving these diverse farmers per their demands and helping them develop themselves. Extension professionals should be competent technically and professionally so as to remain current with the latest technologies and be able to provide services as demanded by clients. Most past studies related to the demand-driven extension approach, such as those by Umar (2015), have focused on examining farmers’ perspectives. Little is known about how

extension professionals perceive demand-driven extension and whether they feel prepared to serve their clients with this extension approach. This paper seeks to address this knowledge gap.

This paper first describes the concept of the demand-driven extension approach. Study objectives, methods, results, discussions and conclusions follow. A number of studies (Birner & Anderson, 2007; Kwarteng & Boateng, 2012; Qamar, 2011; Neuchatel Group, 2006) have described demand-driven extension at length. “Demand-driven” refers to the state where clients, individually or collectively, are willing to buy services, believing that they will get a good return from investing in those services. Hence, only those who can afford them are able to obtain services. Nonetheless, the discourse on demand-driven extension focuses on three types of services. First, the services that commercial farmers seek from private firms that are effective, timely and profitable, and for which they are willing to pay. The second group represents farmers who can pay for services but lack information about them and are not sure about which commodities to focus on. If they obtain information about market demand and other benefits they can get from their produce, they start demanding services. The third type is extension for poor, smallholder and disadvantaged groups who cannot afford private services and also lack the capacity to negotiate for services. Education and information could motivate them to adopt new technologies and practices. Extension professionals must identify these diverse groups and help them satisfy their educational and informational needs.

Pervasive biases exist in traditional extension services (Chambers, 1983). The biases include services favoring wealthier and commercial farmers, services concentrated in easily accessible areas, and services focusing on males and educated farmers. As a result, services seldom reach disadvantaged groups. Second, even when services reach vulnerable groups, better off farmers often capture the services (Baird et al., 2013). This problem is perpetuated because

smallholder farmers lack capacity and mechanisms to articulate their demands, and lack negotiation skills. Additionally, the services that providers do offer tend to be ill-suited to smallholders, and many service providers are unfamiliar with the services that smallholders need.

In many cases, the effectiveness and financial viability of services such as extension services are obstructed by lack of enabling policies to ensure access to information and markets (Neuchâtel Group, 2006). Scholars describe these anomalies as market, government and community failures (Birner & Anderson, 2007). In well-functioning societies, the market balances the demand and supply of goods and services. When there is no supply or an over or under supply of goods and services, then these failures occur. To address those failures, governments have to intervene. When extension services are lacking, governments are obliged to provide them, though this does not always happen. When it does happen, government services can be ineffective and biased. Government mechanisms in many developing countries are top-heavy and plagued with bureaucratic failures. These can mainly be attributed to short-sighted policies that favor elites and urbanites and to long and cumbersome bureaucratic procedures. The private sector and non-government organizations have started serving farmers and filling in gaps in services. Yet anecdotal evidence suggests that these groups are falling victim to market failures, too, while struggling to serve the underserved. Another kind of government failure that poses problems for developing country extension is information asymmetry—when some beneficiaries are unable to get needed information about goods and services through education and training on inputs, markets and so forth (Birner & Anderson, 2007). This asymmetry puts those not receiving information at a further disadvantage.

Widely known as the catalysts for change, extension professionals have to overcome biases and failures and help serve the underserved. To effectively serve their clients, they should

understand the extension phenomenon, articulate the gaps in their abilities to perform services, and identify their own educational and informational needs. Given that resources are limited, it is prudent, as well as efficient and effective, to identify the knowledge and skill gaps among professionals and then tailor education and training to close those gaps. Neuchatel Group (2006) presents capacity development of stakeholders as one of the key requirements for demand-driven extension.

Extension professionals and individuals who want to pursue agricultural extension as careers can gain knowledge and skills in a number of ways—through preservice, in-service, and basic induction training and education, or by participating in seminars, workshops and webinars. A study by Kwarteng and Boateng (2012) illustrates the effectiveness of training on demand-driven extension education curricula among midcareer extension workers in Ghana. Extension agents enjoyed the training and their competency level improved significantly after training.

Learning theories, goals and objectives guide learning approaches. Merriam et al. (2007) describe followers of three learning theories: behaviorists, cognitivists and humanists. For behaviorists, learning is shaped by the changes in environments. Cognitivists uphold learning by understanding how the mind works, particularly pertaining to coding, remembering and storing information in memory. Humanists believe in learning that focuses on affective aspects such as emotions and attitudes. Extension professionals have to be familiar with these the learning theories and be able to employ extension teaching methods that suit their clients.

Preservice courses are academic, relatively long and focus on foundational knowledge. In-service training programs are relatively shorter and focus on topics that are of immediate use or help solve problems encountered on the job. “In-service training is a problem-centered, learner-oriented, and time-bound series of activities which provide the opportunity to develop a

sense of purpose, broaden perception of the clientele, and increase capacity to gain knowledge and mastery of techniques” (Halim & Ali, 1997, Types of Training, para. 4). In-service training includes induction, refresher and on-the job training, among others.

Organizations offer their new employees basic induction training focusing on organizational goals, objectives, working mechanisms, exiting policies and procedures to help new employees adapt to organizational cultures. Finally, seminars, workshops and webinars are becoming increasingly popular because they allow individuals to share their ideas and experiences, learn about research and development happening around them and beyond, and seek out opportunities and ways to improve their work and their organizational performance. However, little is known about how appropriate these learning approaches are for helping extension professionals acquire competencies in Nepal.

## **5.2 COMPETENCIES FOR DEMAND-DRIVEN EXTENSION**

The failures and biases in extension services could be challenged by mobilizing extension professionals who possess the necessary knowledge and skills. Various studies (Birner & Anderson, 2007; Kwarteng & Boateng, 2012; Qamar, 2011; Neuchatel Group, 2006) have suggested 17 competencies that extension professionals ought to possess to provide demand-driven services. A few of these are program planning, gender integration, computer use, agribusiness promotion, use of social media and program evaluation, all skills that extension professionals need to have to offer demand-driven services (Table 5.1).

Building social capital through institutional development can help make extension demand-driven and help benefit resource-poor farmers. Farmers could develop institutional and social capital by forming and working in groups. Extension workers need to be skillful helping make this happen.

Table 5.1 Competencies contributing to demand-driven extension services

Qamar (2011)	<ul style="list-style-type: none"> <li>Program monitoring and evaluation</li> <li>Gender-sensitive services</li> <li>Program planning</li> <li>Coordination with public and private organizations</li> <li>Institutional strengthening—groups, cooperatives</li> <li>Conducting meetings</li> <li>Sharing information with users</li> <li>Knowledge of extension</li> <li>Knowledge of government policy and programs</li> <li>Using computer</li> <li>Coordinating at district and village levels</li> <li>Using social media</li> <li>Collecting resources/funds</li> <li>Capacity building of front-line staff</li> </ul>
Birner and Anderson (2007)	<ul style="list-style-type: none"> <li>Include and serve socially excluded and women farmers</li> <li>Use ICTs for communication</li> <li>Promote farmer-to-farmer-extension</li> <li>Mobilize trained extension workers</li> <li>Knowledge of markets and marketing</li> <li>Outcome- and impact-focused evaluation</li> </ul>
Neuchatel Group (2006)	<ul style="list-style-type: none"> <li>Program planning</li> <li>Promote pluralistic extension</li> <li>Make extension participatory</li> <li>Give due attention to human resource development: in-service training, mentoring or coaching, experiential learning</li> <li>Promote marketing and agribusiness</li> <li>Promote gender awareness</li> <li>Communication skills and methods</li> <li>Helping link famers with research; remaining current and in the loop with research</li> <li>Resources collection and mobilization</li> <li>Group mobilization</li> </ul>

A big issue in agricultural development is gender inequality. This is especially so among developing countries' extension services despite the fact that gender integration is crucial for sustainable and speedy agricultural development. Citing Department of International Development (DFID) (2010), Organization for Economic Co-operation and Development (OECD) (2012) reports that agricultural output in Africa could be boosted by 30% if women had access to inputs equal to what men have. Manfre et al. (2013) argue that, together with increasing the number of women extension agents, enhancing their ability to deliver services needs serious



consideration to improve extension. As its key agenda, then, extension should embrace gender integration and/or equality.

Agriculture is not about agriculture only—it is about business, too. Extension professionals should be familiar with agribusiness and marketing, as well as organizational management, to help farmers in marketing their produce.

Successful and sustainable programs tend to be successful and sustainable. Further, there is increasingly high demand for collaboration among service providers and farmer groups (Ong'ayo et al., 2016). To facilitate collaboration processes, extension professionals need leadership and interpersonal communication skills.

The first step in program development is assessing the needs of users. Needs assessment helps officials understand users and set program goals and objectives. Other key activities that extension professionals regularly undertake include communication with users and other stakeholders, and regular evaluation of programs. Being competent in these areas is critical for the success of extension services.

### **5.3 STUDY GOALS AND OBJECTIVES**

This study's goal is to assess Nepalese extension professionals' level of competency to provide demand-driven extension services in Nepal. Specifically, the study aims to examine extension professionals' perceived level of competency to offer demand-driven extension, identify predictors of their perceived competency and determine ways to acquire competencies needed to provide demand-driven extension.

### **5.4 CONCEPTUAL FRAMEWORK**

The demand-driven extension approach, as explained by Garforth (2004), is based on identifying users' demands (apart from users' perspectives) and involving users as participants in

the extension process, not only as beneficiaries but also as active partners and collaborators. The challenges to implementing demand-driven extension are often characterized as “supply side” and “demand side” (Parkinson, 2009). The former refers to the availability and quality of services; the latter refers to “the ability and willingness of users to identify their advisory needs, seek services and pay for them” (Parkinson, 2009, p. 419).

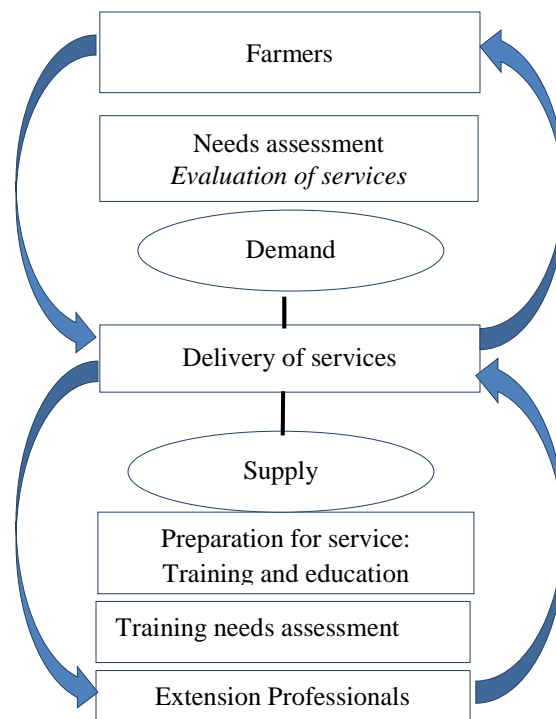


Figure 3: Demand-driven extension model

(Adapted from Neuchatel Group, 2006)

The conceptual framework for this study is grounded in the notion that services and goods delivery are effective when there is harmony between demand and supply (Figure 3). This means providers (supply side) should communicate with and understand their consumers (demand side) (Neuchatel Group, 2006). Service providers should know stakeholders involved in the extension process and communicate with them; they should be accountable to their users for their services, be responsible, articulate and competent at performing their jobs, and strive to

help their organizations innovate and succeed in their endeavors. Service providers have to be even more responsible and competent in their services when their users are resource-poor and lack negotiating and bargaining power. Thus, having competent service providers and/or workers helps cultivate demand-driven extension. To do this, service providers face the challenge of keeping themselves educated, informed, competent and current while they work to assist their clients to progress and prosper, be self-reliant and be able to help themselves.

Knowledge is wealth, and knowledge leads to innovation. To be competent and to succeed in their careers, service providers should continually engage in learning. Since service providers come from many familial and educational backgrounds and vary in age and other demographic attributes, their modes of education and learning may also vary. Learning is effective when learners participate in the learning and appreciate the learning methods.

## **5.5 STUDY METHODS**

### **5.5.1 Study Area**

This study was conducted in Nepal, a small, landlocked country located between India and China. Nepal is divided, from east to west, into three eco-zones—Terai (the southern plain area), hills and mountains; from north to south into five development regions; and politically into 75 districts. It is home to 125 races, ethnicities and cultures; 57.4% females are literate compared with 75.1% males; only 20% of households report females owning fixed assets such as land and houses; and 23% of the households have female household heads (CBS, 2012). Altitudes within Nepal range from 60 meters above sea level to the world's tallest peak, Mount Everest, at 8,848 meters tall.

Of the 26.4 million people living in Nepal, more than two-thirds do some kind of farming. Despite appearing to have potential for high agricultural growth, Nepal has faced low

agricultural productivity and food insecurity for several years now (MOAD, 2014). The major causes for this slow growth are reported as being a less-than-effective extension services system and a low rate of adoption of agricultural technology. With network throughout the country, the Department of Agriculture (DOA) and the Department of Livestock Services (DLS) serve as the key public organizations offering extension services among farmers. There are a few non-governmental organizations (NGOs), private sector agencies and farmer-based organizations--e.g., dairy and coffee cooperatives—that have started providing extension and advisory services to their respective clients and in their command areas, but their coverage is limited.

### **5.5.2 Study Population and Sampling**

The study population was composed of chiefs, subject matter specialists, technical officers working at District Agricultural Development and Livestock Services Offices, and program officers working in agriculture-based non-governmental organizations. The sample ( $n = 349$ ) for the study came from 48 of 75 districts selected on the basis of geographic distribution, agricultural commodity concentration and concentration of extension services.

### **5.5.3 Instrument Design**

The study employed a researcher-designed instrument that had three sections: 48 competencies representing eight core competencies; information about core competencies, such as core competencies required for extension professionals beyond those listed in the instrument as well as ways to acquire core competencies; and respondents' demographics—age, gender, extension service experience, current position, highest education achieved, college/university of undergraduate or basic education. Extension experts in Nepal and on faculty at Michigan State University reviewed the instrument and validated its contents.

The survey was pretested among 22 extension professionals. The researcher met with eight pretest respondents and sought their input on the clarity of the intended meaning of the competency statements, the format of the instrument and the time needed to answer the questions. They were free to make other suggestions to make the instrument more respondent-friendly. As suggested at pretesting, the survey was translated into the local Nepali language. The hard-copy survey was provided both in Nepali and English—one side of the page was in English and the other side had the same questions in Nepali. Respondents were free to choose either version. Of the 305 hard-copy surveys, 60% were filled out in the Nepali version. The reliability coefficient calculated post-hoc was found to be .95, indicating that statements were reliable for measuring the intended perceptions pertaining to demand-driven extension domain.

#### **5.5.4 Data and Variables**

The data for this study came from two self-administered surveys—web and in-person—conducted in August-September of 2015 among non-governmental and governmental agricultural extension professionals.

For objective 1, perception ratings (1 = very low, 2 = low, 3 = moderate, 4 = high, 5 = very high) for the selected 22 process skills and competencies are the dependent variables.

For objective 2, the dependent variable is the index score for the perception ratings of the 22 competencies; the independent variables are demographic attributes (gender, highest education attained, experience in extension services and primary organization). Since competency needs and their levels are context-specific (Mulder, 2010), they vary among individuals. These individual attributes are important to know whether and how participants' perceptions of competency vary and who needs what training.

Multilinear regression is employed to identify demographic factors contributing to or predicting perception ratings of competency level. Multilinear regression examines the relationship between a single dependent (continuous) variable and two or more independent variables, which could be continuous, nominal or ordinal. Lakai (2014), Khalil et al. (2010) and Tiraeyari et al. (2010) have used multilinear regression to calculate perceived importance and competency level of core competencies among extension workers in North Carolina Cooperative Extension in the United States, Yemen and Malaysia, respectively, and found this method useful.

Public extension workers tend to be accountable to and report to their bosses and are less accountable to farmers and are thus less effective at demand-driven services (Neuchatel, 2006). An essential element of demand-driven services is the bottom-up planning process, with which public extension workers are less familiar (Qamar, 2011). NGOs are more effective in demand-driven approach than GOs (Qamar, 2011) and in social mobilization (Swanson & Samy, 2002) and they mobilize staff members who are competent at process skills.

Individuals become confident and competent at providing demand-led services by getting educated and staying informed and current with the latest research and innovations (Qamar, 2011). Education and training help individuals to acquire knowledge and skills, and change their behavior and attitudes (Merriam et al., 2007). Therefore, the higher the education level, the higher the perceived competency ratings for demand-driven services.

Those extension professionals with longer experience in extension tend to be more successful at demand driven extension (Qamar, 2011). As individuals perform a variety of roles, gain exposure to extension services, and thus build their extension experience, their perceived competency levels increase.

In patriarchal societies like some in Asia and Africa, women seldom have opportunities for training and education (Manfre et al., 2013). Males have much more access to and control over resources, including training. Thus the perceived level of competencies for males is higher than that of females.

For objective 3, the variable of interest is the perception rating of ways to acquire core competencies. This is an ordinal data on a 1 to 4 scale, where 1 = not appropriate, 2 = somewhat appropriate, 3 = appropriate, and 4 = very appropriate. Independent variables are gender, highest education attained, experience in extension services, and primary organization. For gender, male is coded as “1” and female as “0.” The highest education attained has three categories: intermediate or I. Sc., B. Sc. and postgraduate. Postgraduate is used as a reference, and the other two groups are dummy-coded. Experience in extension is a scale variable in years. DOA, DLS and NGO are the three groups of primary organization. NGO is used as a reference and the other two groups are dummy-coded. Literature on extension education and training such as Manfre et al. (2013), Qamar (2011) and Swanson and Samy (2002) were the bases for selection of these explanatory variables.

Learning is a continuous process that can happen before the job, at the beginning of the job, during the job and even after staff members retire from their jobs. Learning and information needs vary from individual to individual. The learning approach could be formal, informal or non-formal, but it is imperative for management to offer appropriate training and education to their employees so that they enrich their knowledge and skills and contribute to organizational success. In a study conducted among county extension professionals in Florida, Brodeur et al. (2011) found changes in educational and competency needs of extension educators as they pursue extension as their career path. Brodeur et al. noted that newly recruited educators required

knowledge on networking, office rules and regulations, but professional development to improve competency in the field were educational needs for those with three years or more experience in extension. Learning needs have significant bearing on the methods that workers prefer for learning and education. Learning tends to be effective when learners get the right training.

Ordinal logistic regression is used for this objective because the dependent variable is ordinal and at least one independent variable is scale-variable (Agresti, 2002). The study aims to examine how likely respondents are to indicate the appropriateness of various training and education methods to hone their core competency. If respondents perceive in-service education very appropriate to them, it means this training is beneficial to them and management should scale up and offer this training. Teklewold et al. (2013) used ordinal logistic regression to examine the factors that facilitate or impede the probability and adoption of multiple sustainable agricultural practices in Ethiopia and found this analysis effective.

### **5.5.5 Data Analysis and Study Limitations**

For objective 1, descriptive statistics were calculated for each individual as well as for all 22 statements. For objective 2, a multiple regression equation was calculated to test a model with various demographic attributes as predictors of perceived competency levels. For objective 3, an ordinal regression model was calculated together with the descriptive statistics. This study employed cross-sectional data. What would be more meaningful is a longitudinal study with data from different time points.

## **5.6 RESULTS**

### **5.6.1 Demographic Attributes of Respondents**

Altogether, 349 extension professionals volunteered for the survey. The demographic details (Table 5.2) show that males (93.1%) far outnumbered females. Respondents were of a



mean age of 45.97 years and averaged 20.32 years of experience in extension; 46% were from the Department of Agriculture (DOA), 43.7% from the Department of Livestock Services (DLS) and 10.3% from non-governmental organizations (NGOs).

Table 5.2 Respondents' demographics

Demographic characteristics		<i>n</i>	%
Experience in extension in years ( <i>N</i> = 325)	≤ 5	55	16.9
	6-10	27	8.3
	11-15	15	4.6
	16-20	41	12.6
	≥ 21	187	57.5
Current position ( <i>N</i> = 345)	DADO or DLSO chief	66	19.1
	SMS	111	32.2
	NGO program officer	34	9.9
	TO	134	38.8
Highest education ( <i>N</i> = 344)	I. Sc.	128	37.2
	B.Sc.	82	23.8
	Postgraduate	134	39.0
Gender ( <i>N</i> = 349)	Female	24	6.9
	Male	325	93.1
Primary organization ( <i>N</i> = 348)	DOA	160	46.0
	DLS	152	43.7
	NGO	36	10.3

Of the respondents, 37% held intermediate (12 years) or equivalent degrees, 23.8% had bachelor's or equivalent degrees, and 39% had postgraduate degrees. The DOA and DLS chiefs (*n* = 66) made up 19.1% of the respondents. Approximately one-third (32.2%) of the respondents were subject matter specialists (SMSs). Only 34 (9.7%) were NGO program officers. Technical officers made up more than one-third (134—38.8%) of the respondents.

## 5.6.2 Demand-driven Competencies

The descriptive statistics in Table 5.3 show that respondents perceived themselves to have moderate competency in the demand-driven core competency. The descriptive statistics for 22 individual competencies show the lowest mean ratings—3.42 and 3.48—were given to “computers (email, Internet and web pages) for communication” and “refer to and make use of publications—journals, research reports, etc.” Following closely were “demonstrate basic knowledge of agribusinesses, business opportunities, and help entrepreneurship development among extension clientele” (3.64), “able to allocate resources to address priority needs” (3.65), “share evaluation report within your extension organizations and with stakeholders” (3.66) and “show commitment to career advancement (participate in lifelong learning, in-service training programs, professional meetings and conferences)” (3.66). Receiving the highest ratings were “follow organizational policies and directives for in-service training and professional development” (3.95) and “identify the needs of women, small farmers and minority groups” (3.90).

Table 5.3 Descriptive statistics for competency levels for 22 competencies

Demand-driven competencies	<i>N</i>	<i>Mean (SD)</i>
Familiar with the vision, mission and goals of extension services.	346	3.71 (.74)
Able to engage stakeholders to conduct needs assessment and prioritize needs.	346	3.80 (.80)
Able to allocate resources to address priority needs.	342	3.65 (.80)
Able to engage local development partners such as NGOs, women’s groups and cooperatives in extension programs.	346	3.75 (.86)
Coordinate extension programs and activities within district and subdistrict level.	346	3.84 (.77)
Demonstrate teamwork skills to achieve extension results.	344	3.81 (.81)

Table 5.3 (cont'd)

Engage local stakeholders in implementing extension programs and activities.	343	3.74 (.84)
Follow participatory decision-making model in extension work.	344	3.78 (.79)
Be able to engage women farmers and members of minority groups in extension works.	344	3.83 (.85)
Share success stories and lessons learned with stakeholders through various media.	346	3.68 (.86)
Use various communication channels to disseminate information about important extension activities and programs (e.g., farmers' field day, disease and pest epidemics).	346	3.76 (.85)
Computers (email, Internet and web pages) for communication.	342	3.42 (1.13)
Conduct monitoring and evaluation of extension programs.	348	3.74 (.81)
Share evaluation report within your extension organizations and with stakeholders.	348	3.66 (.85)
Practice principles of good governance (i.e., participation of clients, accountability to clients, transparency).	347	3.83 (.80)
Show commitment to career advancement (participate in lifelong learning, in-service training programs, professional meetings and conferences).	348	3.66 (.96)
Follow organizational policies and directives for in-service training and professional development.	347	3.95 (.87)
Identify the needs of women, small farmers and minority groups.	347	3.90 (.80)
Develop extension programs to benefit women farmers.	345	3.80 (.84)
Engage various social and marginalized groups in extension programs.	339	3.78 (.87)
Refer to and make use of publications—journals, research reports, etc.	347	3.48 (.90)
Demonstrate basic knowledge of agribusinesses and business opportunities, and help entrepreneurship development among extension clientele.	346	3.64 (.85)
Index score (22 statements)	310	3.75 (.67)

*Note.* Scale: 1 = very low, 2 = low, 3 = moderate, 4 = high, 5 = very high

### 5.6.3 Predictors of Demand-driven Competencies

Table 5.4 Multiple regression output for perceived competency ratings regressed with demographic characteristics

Demographic attributes	Unstandardized		Standardized	<i>t</i>	<i>p</i> value
	coefficients		coefficients		
	B	SE	Beta		
(Constant)	3.781	.155		24.325	.000
Experience in extension (years)	.005	.004	.088	1.211	.227
Male (1 = male, 0 = otherwise)	.064	.146	.027	.437	.662
DOA (1 = DOA, 0 = otherwise)	-.024	.120	-.020	-.202	.840
DLS (1 = DLS, 0 = otherwise)	-.014	.127	-.011	-.107	.915
I. Sc. (1 = I. Sc., 0 = otherwise)	-.339	.097	-.271	-3.495	.001
B.Sc. (1 = B. Sc., 0 = otherwise)	-.144	.091	-.103	-1.581	.115

Note. Regression model:  $F = 2.313$ ,  $p < .05$ ,  $r^2 = .047$ , adjusted  $r^2 = .027$ .

The multiple regression outputs in Table 5.4 show that the proposed model with four independent variables—extension experience, gender, primary organization and highest education—is significant to predict the perception ratings on demand-driven competency. The coefficient for I. Sc. indicates that, for I. Sc. degree holders, the predicted perception ratings for demand-driven competency would be .339 lower than for postgraduate degree holders, holding all other variables constant. Although not significant, the *t*-value for B. Sc. is close to 1.96 and the coefficient is negative, indicating that their perception rating for demand-driven competency is negatively related to the rating of the postgraduate degree holders. The other three explanatory variables—experience, gender, primary organization—were not significant to explain the variance of the dependent variable—i.e., perceived level of competency.

#### 5.6.4 Ways to Acquire Demand-driven Competencies

The descriptive statistics show that, overall, respondents perceived all four ways—in-service, preservice, basic induction training and seminars/workshops/webinars—to be appropriate for acquiring core competencies (Table 5.5).

Table 5.5 Descriptive statistics for ratings to ways to acquire demand-driven competencies

Ways to acquire demand-driven competencies	<i>N</i>	<i>Mean (SD)</i>
Preservice training	338	3.44 (.66)
In-service training	342	3.55 (.63)
Basic induction training	318	3.31 (.70)
Seminars, workshops and webinars	342	3.43 (.71)

*Note.* Scale: 1 = not appropriate, 2 = somewhat appropriate, 3 = appropriate, 4 = very appropriate.

The ordinal logistic regression model calculated for preservice training and workshops/seminars/webinars as ways to acquire competencies were not significant (see Figures 4 and 5 in Appendices) and for in-service and basic induction training were significant (see Figures 6-11 in Appendices). The latter two models are described here.

For ordinal logistic regression calculated for in-service training, the model Chi-square value is 13.48 with 6 *df* and *p* value 0.0361. Being male and a DLS respondent increases the likelihood of giving a higher rating to in-service training. Compared with the reference group—i.e., NGO—being a DLS respondent changes the probabilities of selecting in-service training as “not appropriate,” “somewhat appropriate,” “appropriate” and “very appropriate”—from -.0097, -.0261, -.1702 and .2062, respectively. Being a DLS respondent increases the probability of selecting in-service training as very appropriate by 20.62%. Similarly, being male rather than female increases the chance of selecting in-service training as a very appropriate way to acquire

competency by 24.4%. This indicates that DLS and male respondents very much appreciate in-service training.

For basic induction training, the model Chi-square value is 15.70 with 6 *df*. The *p* value 0.015 indicates that being in either of the primary organizations—DOA, DLS—has a significant bearing on selection of basic induction training as a way to acquire core competency. Being a DOA and DLS rather than NGO respondent increases the chance of appreciating basic induction training as a very appropriate way to acquire core competency by 25.10% and 22.61%, respectively.

## **5.7 DISCUSSION**

The findings show that extension professionals in Nepal are only moderately competent to offer farmers demand-driven extension services. Specifically, respondents seemed to have difficulty using computers and referring to and utilizing research papers and journals. The current era is one of information and communication technologies (ICTs). Advancement and use of computers and digital tools are on the rise and will be for years to come. Computers are used for data entry, data storing, writing reports and accessing the Internet. They are increasingly popular for storing and accessing educational materials as well as communicating—e.g., skyping (Martin, Stewart, & Hillison, 2001). Computers make message creating, storing and disseminating easy, reliable, and effective. Past research has shown that disadvantaged farmers can benefit more from the use of ICTs than those who are better off (Fu & Akter, 2011). Surprisingly, this particular statistic has the highest standard deviation, indicating a wide variation in ratings among respondents.

The findings suggest that respondents feel only moderately competent at searching, reading and using scholarly journals and other extension-related publications. Technologies are

evolving quickly. Farming communities are facing new problems for which they need new solutions. Extension professionals have to critically review their programs and their successes and failures. They have to be vigilant of the changes, opportunities and threats existing within their system. To do this, they have to refer to the literature, visit various program sites and observe programs, and, if needed, make necessary changes in programs. These efforts help them to hone their skills at identifying community needs and problems and finding appropriate ways to address those problems. Not being competent at using a computer or not having access to a computer or the Internet could be why respondents did not have access to journals and did not feel competent at using research literature.

Most developing countries have long followed the technology transfer approach and given priority to increasing farm productivity. They overlooked many other avenues in the agricultural value chain, such as postharvest management, including processing and marketing. This has happened because extension workers were either not knowledgeable about these issues or they did not educate farmers about agribusiness. This likely would not have happened if extension services had been demand-led. Agriculture is not solely about production agriculture and extension professionals as well as farmers have to understand the agricultural value chain. Respondents have acknowledged that they are not competent in agribusiness, including marketing, and this is another area that calls for urgent attention.

The majority of the technical officers (122 of 127) hold intermediate (12 years) levels of education. It would be fair to say that the dummy-coded group I. Sc. in the regression model could serve as the proxy for the group (technical officer) that they belong to. Technical officers regularly interact with farmers, and their being familiar with and competent in demand-driven extension is vital to effectively deliver extension services. However, the study finding is the

opposite: that the lower the education level, the lower the extension professionals' perceived level of core competency.

In-service training and participation in workshops and seminars could help professionals gain competencies and fill the knowledge gaps created by their not receiving higher levels of preservice education. This also seems not possible, given the fact that in a top-down extension system such as that in Nepal, resources flow from the top and rarely trickle down to the grass roots. Additionally, the findings that extension experience does not have any bearing on perceived competency levels challenges the findings of Lakai (2014), who reported extension experience significantly and positively contributing to perceived competency levels. Note: overall, the  $R^2$  value of the model is very low, and explanatory variables explain minimal variance of the perceived competency levels. This could be due either to small sample size or to other factors, which need further study.

To acquire demand-driven competency, males and DLS respondents felt in-service training (applied training focusing on current problems and issues) very appropriate more than NGO respondents. Similarly, DOA and DLS respondents appreciated basic induction training more than NGO officers did. The findings also reveal that NGO officers did not value on-the-job learning as much as GO officers did. It could be that NGOs in Nepal do not offer in-service and basic induction training programs and NGO staff members have no knowledge of these learning modes. It could also be due to the fact that NGOs have a short life -- once a project period is over and the project terminates, the NGOs stop to operate. Therefore, NGOs may be reluctant to invest in staff training such as in-service training. If that is the case, it is an issue that should be addressed by policy.



## 5.8 CONCLUSIONS

This study has examined perceived levels of competency for providing demand-driven extension services among Nepalese extension professionals, tried to determine predictors for demand-driven competency and identified appropriate ways to acquire competencies. The demand-driven theory envisions harmony between supply and demand of services. When there are failures in services, public intervention is required. Extension professionals are obliged to serve resource-poor farmers who are unable to negotiate and bargain for services. Extension workers need to remain current with their competencies. Though extension professionals in Nepal perceived themselves as being moderately competent at serving their clients, they are in need of training and education to enhance their competencies.

The proposed model for determining predictors for demand-driven competency was significant, underscoring the need and importance of preservice training among extension professionals. The technical officers' low ratings of their perceived competency are indicative of their need for training. In today's era of information and communication technologies, Nepal should be using the Internet, smartphones and social media (e.g., Facebook) to educate its extension workers about national and international innovations and developments, and encouraging them to apply those innovations in their fields.

There appear to be differences between extension workers in public and non-profit organizations in their selection of ways to acquire competencies. For instance, there is a need to examine why NGO professionals do not highly appreciate basic induction and in-service training to hone their competencies. Nonetheless, extension management, educational institutions and training centers in Nepal should incorporate demand-driven extension competencies in their curricula and programs; prepare extension professionals, including trainers, with essential

logistics; and offer in-service training such as refresher training, orientations and on-the job training to extension professionals throughout their extension careers.

## **APPENDIX**

. ologit J_1 L Male_dummy DOA_dummy DLS_dummy BSc_dummy ISc_dummy						
Iteration 0: log likelihood = -287.15698						
Iteration 1: log likelihood = -284.44796						
Iteration 2: log likelihood = -284.44536						
Iteration 3: log likelihood = -284.44536						
Ordered logistic regression						
				Number of obs	=	311
				LR chi2(6)	=	5.42
				Prob > chi2	=	0.4908
Log likelihood = -284.44536				Pseudo R2	=	0.0094
J_1	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
L	.0109972	.0134274	0.82	0.413	-.0153199	.0373144
Male_dummy	.0694254	.4486865	0.15	0.877	-.809984	.9488348
DOA_dummy	.1130554	.3988383	0.28	0.777	-.6686533	.8947641
DLS_dummy	.417365	.422633	0.99	0.323	-.4109804	1.24571
BSc_dummy	.6288696	.3199759	1.97	0.049	.0017284	1.256011
ISc_dummy	.4274557	.3128965	1.37	0.172	-.1858102	1.040722
/cut1	-4.925669	1.148747			-7.177172	-2.674166
/cut2	-1.628207	.6002651			-2.804705	-.4517093
/cut3	.7609924	.5824855			-.3806582	1.902643

Figure 4: Ordinal logistic regression output for perceived ratings for preservice training

. ologit J_4 L Male_dummy DOA_dummy DLS_dummy BSc_dummy ISc_dummy						
Iteration 0: log likelihood = -307.49088						
Iteration 1: log likelihood = -306.10002						
Iteration 2: log likelihood = -306.0971						
Iteration 3: log likelihood = -306.0971						
Ordered logistic regression						
				Number of obs	=	316
				LR chi2(6)	=	2.79
				Prob > chi2	=	0.8350
Log likelihood = -306.0971				Pseudo R2	=	0.0045
J_4	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
L	-.0058989	.0132255	-0.45	0.656	-.0318204	.0200226
Male_dummy	.2924608	.4547319	0.64	0.520	-.5987974	1.183719
DOA_dummy	.5480371	.3842113	1.43	0.154	-.2050033	1.301077
DLS_dummy	.5501404	.4065183	1.35	0.176	-.2466207	1.346902
BSc_dummy	.0866118	.3110127	0.28	0.781	-.5229619	.6961855
ISc_dummy	.102269	.3086052	0.33	0.740	-.502586	.7071241
/cut1	-3.671984	.7562572			-5.154221	-2.189747
/cut2	-1.457165	.5979188			-2.629064	-.2852657
/cut3	.5270619	.589122			-.6275961	1.68172

Figure 5: Ordinal logistic regression output for perceived ratings for workshops/seminars/webinars

```
. ologit J_2 L Male_dummy DOA_dummy DLS_dummy BSc_dummy ISc_dummy
```

Iteration 0: log likelihood = -264.93535  
Iteration 1: log likelihood = -258.26359  
Iteration 2: log likelihood = -258.19692  
Iteration 3: log likelihood = -258.19689  
Iteration 4: log likelihood = -258.19689

Ordered logistic regression

Log likelihood = -258.19689

Number of obs = 316  
LR chi2(6) = 13.48  
Prob > chi2 = 0.0361  
Pseudo R2 = 0.0254

J_2	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
L	-.0172096	.0137434	-1.25	0.210	-.0441463	.009727
Male_dummy	.9969484	.4607506	2.16	0.030	.0938937	1.900003
DOA_dummy	.6528503	.3939239	1.66	0.097	-.1192263	1.424927
DLS_dummy	.8987511	.4176224	2.15	0.031	.0802261	1.717276
BSc_dummy	-.1244196	.3323273	-0.37	0.708	-.7757691	.5269299
ISc_dummy	-.3983333	.3224321	-1.24	0.217	-1.030289	.233622
/cut1	-3.385973	.741129			-4.838559	-1.933386
/cut2	-2.015958	.6093301			-3.210223	-.821693
/cut3	.6032151	.5852171			-.5437894	1.75022

Figure 6: Ordinal logistic regression output for perceived ratings for in-service training (1/4)

```
ologit: Changes in Probabilities for J_2
```

Male\_dummy

	Avg Chg	Not_appr	Somewhat	Appropri	Very_app
0->1	.1220426	-.01767553	-.04460255	-.18180713	.24408519

	Not_appr	Somewhat	Appropri	Very_app
Pr (y x)	.01139362	.03199383	.34026945	.61634308

	L	Male_dummy	DOA_dummy	DLS_dummy	ISC_dummy	BSc_dummy
x=	20.2215	.93038	.468354	.424051	.357595	.243671
sd_x=	10.6292	.25491	.499789	.494982	.480052	.429977

Figure 7: Ordinal logistic regression output for perceived ratings for in-service training (2/4)

```
. prvalue
```

ologit: Predictions for J\_2

Confidence intervals by delta method

	95% Conf. Interval
Pr(y=Not_appr x): 0.0114	[ 0.0002, 0.0226]
Pr(y=Somewhat x): 0.0320	[ 0.0131, 0.0509]
Pr(y=Appropri x): 0.3403	[ 0.2871, 0.3935]
Pr(y=Very_app x): 0.6163	[ 0.5617, 0.6710]

	L	Male_dummy	DOA_dummy	DLS_dummy	BSc_dummy	ISc_dummy
x=	20.221519	.93037975	.46835443	.42405063	.24367089	.39873418

Figure 8: Ordinal logistic regression output for perceived ratings for in-service training (3/4)

```
. prchange DLS_dummy
```

ologit: Changes in Probabilities for J\_2

DLS\_dummy

	Avg Chg	Not_appr	Somewhat	Appropri	Very_app
0->1	.10310179	-.00977044	-.02617479	-.17025836	.20620358

	Not_appr	Somewhat	Appropri	Very_app
Pr(y x)	.01139362	.03199383	.34026945	.61634308

	L	Male_dummy	DOA_dummy	DLS_dummy	BSc_dummy	ISc_dummy
x=	20.2215	.93038	.468354	.424051	.243671	.398734
sd_x=	10.6292	.25491	.499789	.494982	.429977	.490414

Figure 9: Ordinal logistic regression output for perceived ratings for in-service training (4/4)

. ologit J_3 L Male_dummy DOA_dummy DLS_dummy BSc_dummy ISc_dummy						
Iteration 0: log likelihood = -301.04937						
Iteration 1: log likelihood = -293.27724						
Iteration 2: log likelihood = -293.197						
Iteration 3: log likelihood = -293.19696						
Iteration 4: log likelihood = -293.19696						
Ordered logistic regression						
				Number of obs	=	294
				LR chi2(6)	=	15.70
				Prob > chi2	=	0.0154
Log likelihood = -293.19696				Pseudo R2	=	0.0261
J_3	Coef.	Std. Err.	z	P> z	[95% Conf. Interval]	
L	-.0000845	.013171	-0.01	0.995	-.0258992	.0257303
Male_dummy	.5317574	.4746309	1.12	0.263	-.398502	1.462017
DOA_dummy	1.048509	.4013311	2.61	0.009	.2619147	1.835104
DLS_dummy	.9363333	.4193305	2.23	0.026	.1144607	1.758206
BSc_dummy	-.0013453	.3260782	-0.00	0.997	-.6404467	.6377561
ISc_dummy	-.4655935	.3128123	-1.49	0.137	-1.078694	.1475072
/cut1	-3.524807	.7942773			-5.081562	-1.968053
/cut2	-.7941662	.5876966			-1.94603	.357698
/cut3	1.522259	.5971057			.3519537	2.692565

Figure 10: Ordinal logistic regression output for perceived ratings for basic induction training  
(1/2)



```
. prvalue

ologit: Predictions for J_3

Confidence intervals by delta method

              95% Conf. Interval
Pr(y=Not_appr|x): 0.0089 [-0.0012, 0.0190]
Pr(y=Somewhat|x): 0.1121 [ 0.0760, 0.1482]
Pr(y=Appropri|x): 0.4616 [ 0.4027, 0.5206]
Pr(y=Very_app|x): 0.4173 [ 0.3599, 0.4748]

              L   Male_dummy   DOA_dummy   DLS_dummy   BSc_dummy   ISc_dummy
x=   19.823129   .92857143   .46598639   .42517007   .24829932   .40816327

. prchange DOA_dummy

ologit: Changes in Probabilities for J_3

DOA_dummy
      Avg|Chg|      Not_appr      Somewhat      Appropri      Very_app
0->1   .12551611  -.00931838  -.10107276  -.14064109   .2510322

      Not_appr      Somewhat      Appropri      Very_app
Pr(y|x)   .00889591   .11214747   .46164981   .41730681

              L   Male_dummy   DOA_dummy   DLS_dummy   BSc_dummy   ISc_dummy
x=   19.8231   .928571   .465986   .42517   .248299   .408163
sd_x= 10.7701   .257978   .499692   .495212   .432763   .492332

. prchange DLS_dummy

ologit: Changes in Probabilities for J_3

DLS_dummy
      Avg|Chg|      Not_appr      Somewhat      Appropri      Very_app
0->1   .11307602  -.00797604  -.08777358  -.13040245   .22615203

      Not_appr      Somewhat      Appropri      Very_app
Pr(y|x)   .00889591   .11214747   .46164981   .41730681

              L   Male_dummy   DOA_dummy   DLS_dummy   BSc_dummy   ISc_dummy
x=   19.8231   .928571   .465986   .42517   .248299   .408163
sd_x= 10.7701   .257978   .499692   .495212   .432763   .492332
```

Figure 11: Ordinal logistic regression output for perceived ratings for basic induction training  
(2/2)

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## **CHAPTER 6 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS**

Improving agricultural productivity is vital for feeding a growing world population. Strengthening extension services is crucial to improving agricultural productivity. The effective delivery of extension services needs to be in the hands of competent extension professionals. Extension professionals become competent when they are knowledgeable and skillful about extension services and are able to deliver the services demanded by their clients. Competent extension professionals are able to identify the problems farmers face, adapt to changing contexts, employ extension methods and tools that farmers like, work with farmers and engage with them in co-learning, and motivate and persuade farmers to adopt and adapt new agricultural technologies and practices. However, little is known about the competencies of Nepalese extension professionals for serving their clients. Identifying competency areas and gaps in competencies among extension human resources is paramount to improving extension services. By employing a literature review and focus group discussion; collecting and analyzing survey responses; and soliciting input from extension professionals, extension experts, extension educators, and other key informants; this four paper dissertation has sought to identify the core competencies of extension professionals in Nepal, and examine the level of and gap in those core competencies.

Core competency needs are contextual. Extension management should know the essential competency domains their extension professionals require, which lay the foundation for an additional analysis on competency, such as an examination of the level of competency, identifying gaps in competencies and determining areas for training and education. Within this backdrop, the first paper identified eight core competencies: communication skills, program planning, program implementation, educational and informational technology, program evaluation, diversity, personal and professional development, and technical subject matter

knowledge expertise. The list illustrates that extension is not only about agricultural production and the transfer of technology, which are the focus of traditional extension thought to be, it is also linked to the social and behavioral sciences and the agribusiness sector.

Extension agents are vehicles of education and information, and precursors of change. To ensure effective extension services, extension agents should be positive, motivated, and dedicated to their profession. Knowing how they value extension core competencies helps in identifying the training and educational needs of staff members. Using data collected through in-person and web surveys, the second paper examined how extension professionals perceived the importance of the core competencies. Extension professionals perceived core competencies as being important or very important to their work. The highest rating was given to personal and professional development indicating that extension professionals in Nepal are positive about their extension work, and they like to attain training and education and gain more knowledge as needed. Program evaluation received the lowest rating of importance. Perceptions of extension professionals differed by gender and education level, but not by their under graduate college/university, experience in extension, age and the current position. Education appears to have significant bearing on extension professionals' perceptions.

The third paper revealed that extension professionals do not perceive themselves to be as competent in core competencies as they ought to be if they are to effectively serve their clients. Information and communication technologies (ICTs), including computer use and e-learning, happened to be the weakest areas of extension professionals. This finding warrants training and empowering extension officers on ICTs including computer use. DADO and DLSO chiefs felt more competent in most of the core competencies than their fellow staff members—subject matter experts, and technical officers—or NGO program officers. Foreign-educated extension

workers appear to be more competent than in-country-educated workers indicating gaps in the national agricultural education system. The DLS and DOA chiefs perceived themselves to be more competent than did SMSs, NGO program officers, and technical officers. Technical officers happened to have the lowest level of perceived competency for all core competencies, which is a serious issue Nepal has to urgently examine and address.

Furthermore, there is a significant discrepancy between the desired and actual levels of competency for core competencies with perceived level of importance of all core competencies being significantly higher than their perceived level of competencies. Core competencies with the highest competency gap—educational and informational technology, technical subject matter expertise and program evaluation—are the areas in which extension professionals in Nepal are in need of training and education.

The fourth paper assessed the perceived competency level for demand-driven competency, determines predictors of perceived competency for demand-driven competencies and identified ways to acquire those competencies. Respondents felt themselves to be moderately competent to serve in demand-driven extension. The regression equation calculated to determine the predictors of demand-driven competency highlights the need and importance of preservice training among extension professionals. Technical officers' low ratings of perceived competency are indicative of their need for training. In general, all four ways of acquiring competency are found to be equally important, but respondents from government organizations indicated that the basic induction or in-service training are more appropriate for them compared to respondents from non-governmental organizations.

This study offers several messages that can be pursued to make extension services demand-driven, and establish extension workers as catalysts for change. First, the traditional



technocentric and reductionist paradigm of extension that extension professionals have been following does not serve the purpose of extension services in today's changing contexts. There should be no delay in orienting extension human resources and agricultural students—future extension workers—to a holistic extension approach based on a constructivist paradigm. The new paradigm seeks extension human resources to be mindful of their contexts—their clients, their stakeholders, their needs, their culture, the new technologies, and extension evolution—and to take a necessary steps to address emerging problems and improve extension services.

Many studies have noted that extension services are no longer attractive, and there are fewer students pursuing extension education than ever before. The study respondents seemed positive and optimistic about extension services. Although, the study findings show low levels of competency in extension theories and principles among extension professionals. To break negativities and attract resources in extension services, it is critical that current extension human resources understand extension theories, principles, evolution, and research and work to put them into practice.

Agricultural extension services in Nepal is transitioning to a new approach, one that embraces pluralistic, demand-driven, and participatory characteristics. Even though extension professionals gave high ratings to the importance of core competencies it would be helpful if transformation agenda are pushed further. The significant gap in core competency levels suggests that there is much to be done, especially in terms of providing training and education to extension professionals, and preparing them to carry on the transformation.

Gender integration in extension remains an important issue in agricultural development in Nepal. Although female extension professionals perceived core competencies to be highly important to their work, much remains to be done to ensure gender equality in extension. First of

all, there are only a few female extension professionals in extension and increasing their number is vital. Second, they should be given training and opportunities to attend workshops and seminars that can help to hone their core competency skills.

Use of information and communication technologies (ICTs) in extension communication cannot be overemphasized. Nepal should run a campaign to use ICTs such as mobile phones, computers, the Internet, and social media (e.g., Facebook) in extension services. This requires infrastructure development such as employing computers in extension offices; providing extension professionals with access to the Internet; offering capacity development such as training and orientation on how to use computers and other media.

Perceived gaps in core competencies means extension professionals do not feel as competent as they should be in their extension work. Since core competencies refer to the state of having the required knowledge, skills, and abilities to effectively execute their tasks, extension professionals in Nepal should find ways to improve their competency skills. They need opportunities for internship and job shadowing so that they can enrich their competencies, and so they will be able to effectively decipher and solve farmers' problems once they go to their respective fields.

Nurturing professionalism in extension services came up in the study. Professionalism means offering quality and reliable services that meet standards set by respective professional organizations. Setting standards for services and regulating services through issuing licenses to those professionals who meet professional standards paves the way to professionalism. Nepal may want think along these lines to initiate professionalism in extension services.

A framework based on theory of change is suggested in Table 6.1 below. Government commitment is essential to implement these policy changes.

Table 6.1 Strengthening core competencies among extension professionals in Nepal

<p><b>Impact:</b></p> <ul style="list-style-type: none"> <li>Increased farm productivity and improved farmers' livelihood</li> </ul>	<p><b>Assumptions:</b></p> <ul style="list-style-type: none"> <li>Effective implementation of policy</li> <li>Political stability and commitment</li> </ul>
<p><b>Outcome:</b></p> <ul style="list-style-type: none"> <li>Availability and access to demand-driven, participatory, pluralistic extension services</li> <li>New extension services and agricultural education and training policies in place</li> <li>Change in knowledge, attitude, behavior of extension human resources</li> </ul>	<p><b>Assumptions:</b></p> <ul style="list-style-type: none"> <li>Ministry of Agricultural Development, Department of Agriculture and Departmental of Livestock Services adopt study findings</li> <li>Adequate funding is available</li> </ul>
<p><b>Outputs:</b></p> <ul style="list-style-type: none"> <li>Agricultural students and extension professionals receive core competency training and education</li> <li>Extension education and training curricula are revised/updated</li> <li>Ways to acquire core competencies determined</li> <li>Core competency gaps identified</li> <li>Core competencies—importance and competency levels identified</li> <li>Core competency areas identified</li> </ul>	
<p><b>Implementation strategy:</b></p> <ul style="list-style-type: none"> <li>A five year project coordinated by the Ministry of Agricultural Development and representation from agricultural research, education, the private sector, non-governmental organizations, and farmers</li> <li>Participatory program planning, implementation and evaluation</li> <li>Provision of short-term, medium-term and long-term evaluation</li> <li>Development of modules for preservice, in-service, basic induction education and training; as well as workshops, seminars, and webinars</li> </ul>	

Knowledge generation and knowledge management are integral to competency development. Extension professionals are required to coordinate and partner with various stakeholders, including farmers, as well as interact with them and promote innovations. Organizational support, such as providing a proper learning environment, is paramount to motivating extension professionals to learn and remain current about new knowledge and information. Letting extension professionals have access to educational materials such as

bulletins and journals is vital for them to learn about research and innovations. In conclusion, Nepal needs to adapt systemic approach to core competency development.

Extension professionals in Nepal conduct many different programs and work with and for many different users and stakeholders. Systematic evaluation of the programs, documenting extension professionals' work experiences, and writing and sharing the lessons-learned with the wider farming communities and stakeholders—all of which is lacking at present—will greatly contribute to strengthening extension services.

Demand-driven extension envisions co-learning between farmers and extension professionals. Extension professionals have to visit farmers and their farms; to study and understand their contexts and farming systems; and to work with farmers. This helps farmers to understand extension professionals, and to learn new and improved technologies from those extension professionals vis-à-vis extension professionals would understand the crux of the problems and potential of local farming systems.

This study was limited to self-ratings of core competencies by extension workers. Examining farmers' perceptions of the core competencies of extension workers would help prioritize skills for demand-driven extension services. Similarly, soliciting opinions of the policy level people and university faculty's perceptions of core competencies would help refine the training on core competencies. Finally, a careful review of current curricula for extension and training will provide a basis for new training program on extension. Thus, future research may look into these areas.