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Government Run vs. University Managed Agricultural Extension: A Review of Nepal, India and the United States

Nav Ghimire[1*], Vikram Koundinya[2] and Mary Holz-Clause[2]

[1]Green Lake County, University of Wisconsin-Extension, USA.
[2]Office of Economic Development, University of Connecticut, USA.

Authors' contributions

All authors were involved in developing the research idea. Author NG laid-out the design and wrote the paper. Authors VK and MHC provided inputs in literature review and their perspectives in agricultural extension from their respective countries.

Review Article

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ABSTRACT

Aims: The creation of an agricultural extension system and its evolution over time is affected by many factors such as history of the country, cultural and community mandates, farming systems, and public policy. There are notable differences in the agricultural extension systems operating around the globe. The purpose of this paper was to review the agricultural extension systems in Nepal, India, and the United States
Methodology: A comprehensive review of literature was conducted to identify the similarities and differences in the agricultural extension systems in the stated countries. Relevant documents used included creation legislation for each country, global analysis from organizations such as Food and Agricultural Organization, and peer-reviewed journal articles. The authors' extension experiences working in the stated countries also provided inputs to develop this paper.
Results: Differences were observed in the area of extension models, program delivery, outcomes assessment, and research–extension interface among agricultural extension systems compared in this study. The program delivery mechanism of Nepal and India was mainly driven by 'top down expert model'. Contrary to this, in the United States, extension was operating under a learning model. In all three countries many small scale-farmers felt

**Corresponding author: E-mail: nav.ghimire@ces.uwex.edu;*

underserved and disengaged from their extension services. It was found that only small segments of the extension audience were served in comparison to the large number of farmers and their families residing in these countries. In Nepal and India, it was perceived that extension agents lacked professional commitment to serve farmers and were mostly accountable to their managers.

Conclusion: Needs were found not–aligned to the extension services offered by all, suggesting a lack of appropriate extension leadership. All the systems need to ensure they are meeting both the perception and realities of their clients. Clients and taxpayers need to feel there is a public value for the extension systems.

Keywords: Agricultural extension systems; Nepal; India; The United States; review.

1. INTRODUCTION

Agricultural extension can be defined as a service or a system that uses educational processes to assist farmers and their families for improving production practices and raising incomes. It plays a significant role in promoting agricultural productivity, increasing food security, and improving rural livelihoods [1,2].

Due to changing technology, increasing globalization, and transforming cultural and community mandates, agricultural extension has a wider role to play in the 21st century. These include developing human and social capital, enhancing knowledge and skills for production and processing, facilitating access to markets, organizing producer groups, and working with growers toward sustainable natural resource management [3].

The creation of an 'agricultural extension system' in a country and its evolution over time is affected by many factors. These include history of the country, cultural tradition, farming systems, public policy, country's need at the time of inception of the extension service, economic capacity to fund the programs, nature of the programs-competing or complementary, and political, social, and environmental factors [4,5]. These factors largely determine the structure of an agricultural extension system, research-extension interface, extension agents' training, and services offered to clients.

There are notable differences in the agricultural extension systems operating around the globe. Reviewing these differences provides opportunities for learning from each other and exploring ways to identify possible avenues for improved extension services. This paper focuses on the agricultural extension systems in Nepal, India, and the United States (U.S.).

2. PURPOSE AND OBJECTIVES

The purpose of this paper was to review the agricultural extension systems in Nepal, India, and the U.S. The information gleaned in this article could be useful for policy-makers and extension administrators to identify ways for improved educational services to extension audiences through training, clients' involvement, and policy development.

The specific objectives of this study were to review the three countries' agricultural extension systems in terms of the:

1. History and origin of the agricultural extension systems;
2. Models of agricultural extension and program delivery mechanisms;
3. Existing research-extension interface;
4. Staff trainings and their performance appraisals; and
5. Current situation and implications for future direction.

3. METHODS

A comprehensive review of literature was conducted to identify the similarities and differences in the agricultural extension systems in the stated countries. Relevant documents used included creation legislation for each country, global analysis from organizations such as Food and Agricultural Organization, and peer reviewed journal articles.

The comparison of agricultural extension systems was further validated with agricultural extension specialists in these countries. Additionally, the authors have a total of more than 45 years of combined working experience in the extension systems in Nepal, India, and in the U.S. Their experiences and views provided inputs to develop this paper.

4. RESULTS AND DISCUSSION

4.1 Objective 1: History and Origin of Agricultural Extension Systems

There are not known legislative events, which were the genesis of agricultural extension in Nepal and India. In Nepal, the interest of aristocratic society–Rana Regime-for improved livestock (dairy cows, horses), clover grass, and tea, led to the establishment of an agriculture office in 1921. However, the need for an agricultural extension system as an approach to deliver educational programs nationwide was only noted after 1951 [6,7]. Today, each district has an agricultural extension office.

In India, a central department of agriculture was established after the 1866 Orissa famine. In 1905, the government of India passed a legislative order to have an agriculture director in each state to advise farmers for better agriculture [8]. As a planned effort during the early post-independence period, India began a community development program in 1952, followed by the national extension service in 1953 [9]. These programs were able to educate farmers to take up improved methods of farming across the country [10]. Today, each district has a department of agricultural extension.

Agricultural extension programs in Nepal and India are primarily funded by the national and state governments. To enhance the effectiveness of governments' regular extension programs, international donor supported projects are often also implemented. Therefore, donors' influence in developing extension approaches and policies is important in these countries. Authors [11,12,13] stated that it is mainly through the influence of donors that the agricultural extension work has been understood in terms of philosophy and framework in emerging countries.

Roots of the U.S. agricultural extension go back to the 1862 Morrill Act and the creation of the land-grant university system to 'educate citizens in practical agriculture'. The outreach

mission of the land-grant institution was further expanded by the passage of the Smith-Lever Act of 1914, which created the Cooperative Extension Service (CES) manifest through the land-grant university in every state. The mission of the CES is to 'take educational resources of the university to the people where they live' [14]. Today, the U.S. agricultural extension in each state continues to be managed by land-grant universities.

Agricultural extension in the U.S. is supported by public tax dollars and the extension audience through formal needs assessment and informal feedback has some influence on the decisions for type of research information and extension services needed. The Federal, state, and local (county) governments jointly fund the U.S. Cooperative Extension Service. This decentralized extension system has an extension office in nearly every county within each state. Although the systems across the U.S. vary, generally the local government provides about one-third of the funding and the other two-third of the funding in extension systems around the country comes through state and federal contributions.

4.2 Objective 2: Models of Agricultural Extension and Program Delivery Mechanism

In Nepal and India, the agricultural extension service is run by the ministry of agriculture as one of the public services to farmers and their families. In both countries, the government-developed five year plan sets the priorities for extension based on the national strategy as identified by the government. It has been our observation that process of determining priorities is not inclusive or sufficiently participatory of all stakeholders, especially farmers. In Nepal, the District Agriculture Development Office with Agriculture Service Centers at the local level implements extension programs. In India, District Department of Agriculture with Mandal agricultural units (comparable to a county in the U.S.) provides extension services to farmers at the local level. In both countries, the agriculture extension work at the grassroots is tied to the national target of agricultural development focused mainly on food security; however, achieving food and nutrition security still remain a challenge [15,16,14].

The agricultural extension program delivery mechanism of Nepal and India is mainly driven by 'top down expert model'. The basic concept of extension is to transfer the appropriate technology to farmers and get them adopted [7,17]. In such an approach, farmers do not necessarily share in the research and learning process but are expected to adopt the outcomes of research from stations [18]. In the top-down technology transfer model, the extension system functions as the expert. Extension agents are dependent on the central government administration (ministry of agriculture and/or research stations) for what need to be determined for farmers and lessons to be taught [19].

According to [20], most extension professionals in the emerging world assume that they know what farmers want and believe that farmers do not have capacity to identify their needs and make decisions for their own agricultural development. In 2009, authors [21] observed similar results in Nepal. They found that extension agents did not value or considered farmers' views as important for program development and that farmers often participated in the programs mainly for incentives (such as, seeds and fertilizers) that came with program participation. Authors [22] in Ethiopia worked closely with farmers in a participatory watershed management project. They observed that a successful extension program is only possible through farmers involved at all stages of problem identification, developing solutions, implementing programs, and evaluating the effectiveness.

The model of agricultural extension in the U.S. is 'learning', in which extension agents learn from farmers being served, as well as listen and link to research and markets, in setting extension priorities [17]. Under the extension as a learning approach, farmers and extension agents work together to address farmers' needs. This two-way model allows for information and knowledge transfer to occur so that the farmers are informing research based upon their needs and research provides applications back to the agricultural community.

The U.S. extension model is a combination of technology transfer, problem solving, and imparting knowledge [23]. Extension work is guided by the principle of 'education for action'; therefore the primary focus of technology transfer is to bring educational change in people to achieve knowledge and progress [24]. Today, the U.S. provides agricultural extension services to people in primarily four program areas: agriculture and natural resources; 4-H youth development; family living and nutrition; and community development and leadership.

In Nepal and India, program reporting is based largely on 'process evaluation' rather than on 'impact evaluation'. Extension agents are focused on reporting number of people attending a program and expenses of the fiscal budget, rather than impact or outcomes of program on the lives of people. The impact evaluation such as determining the change in socio-economic conditions of the community is often limited to the donor supported projects mainly to continue project grants for the following year(s). The traditional agricultural extension program has not shifted its focus to impact evaluation [25]. The reasons are inadequate opportunities for extension agents to improve their evaluation capacities or because their focus is on technical expertise [26] and inadequate attention of the government to commit time and resources for impact evaluation [27,28]. If the opportunity had been provided to agents for building evaluation competence, process evaluation could have been used with good indicators to demonstrate how effectively the programs were implemented, how well participants could learn, and what areas needed to be improved for better program delivery in the future.

While planning an extension educational program in the U.S., the federal government mandates extension agents connect evaluation to program design using a logic model framework. Therefore, program evaluation is focused mainly on demonstrating public value, improving program for better practice, and building capacity of extension agents to become good educators [29]. Public value is created when society as a whole finds value in a public service or program-this includes both those who directly benefit from the service and those who do not [30]. However, the authors have observed that there is inconsistency among extension educators to ensure the outcome(s) of an extension program. For example, the same program or curriculum may be offered across a state or region, with differing results. The effectiveness of the presenter, the receptivity of receiving the information/knowledge as well as relevance could impact the outcomes of the programming along with many other factors. Some authors also identified the reasons for inconsistency in reporting program outcomes as educators' lack of knowledge and skills and inadequate opportunities for improving their evaluation capacities followed by their academic training focused on technical content with little emphasis on educational process skills [31,32,33,34].

4.3 Objective 3: Existing Research-extension Interface

In Nepal and India, research and extension are governmental entities, independent of each other, have different foci, and are influenced by donors' grant and loan policies. The subject specific front–line extension agents are housed in the district extension offices and the subject-matter specialists are located in the research stations. Due to weak research–

extension linkages, research generated information is not always relevant for extension [6,35]. The agricultural universities are not a part of the government's national extension and research network because they are housed under the ministry of education.

By its structure, located within the land-grant universities, the U.S. system incorporates both research and extension work under the same umbrella. Extension's input is considered as important for guiding research to generate technology based on the clients' needs and feedback. Subject-matter specialists are located at the land grant universities in each state, and most have joint research and extension appointments, so they may be the same person. This helps to create stronger linkages between research and extension. These specialists provide regular training programs for extension educators as well as private-sector firms. Under the mandate of many state-authorized certifications, the private-sector agricultural advisors are required to complete continuing education and professional training provided by the land-grant universities. This approach ensures that farmers receive up-to-date technical advice from both public extension and private-sector advisors [17].

Though, both research and extension works are important to achieve the land-grant mission, many extension leaders in the U.S. noted lack of programming integration between these two entities. Extension professionals often felt that research was highly valued within the colleges and that research colleagues did not show interest in extension's work or understand the purpose of extension. However, it is only through Extension's work, researchers can consider the practical implications of their work in the community [45].

4.4 Objective 4: Staff Trainings and their Performance Appraisal

The agricultural extension programs in Nepal and India are implemented by district level extension offices. Extension agents implement programs as their targeted responsibilities assigned by Extension managers. These agents are mainly accountable to their managers, as their manager is responsible for evaluating the performance of an extension agent, not the farmers or any other publicly elected committees, as in the U.S. [36,26]. It does not make much difference to extension agents whether or not they properly implement the program, so long as their managers are happy with them [26].

Each extension manager in Nepal and India is accountable to implement the programs as planned and meet the needs of citizens. However, there is lack of appropriate supervision mechanism at the Ministry of Agriculture to make sure that extension managers are working as guided by the national agricultural development plan and policies. The reasons are lack of financial resources, manpower, incentives, and political commitment followed by weak infrastructure for transportation and communication to visit rural areas where programs are implemented. For example, Nepal is a landlocked country with 78% hills and mountains. In addition, an important but overlooked factor contributing to the poor performance of extension agents and extension managers in these countries is job safety granted by tenured nature of the job which may result in complacency and sluggishness. This indicates that government needs to strive for standard job performance of extension professionals through policy, training, motivation, and incentives or by other means.

According to [26], extension agents in emerging countries have grown up in an environment where there is neither reward for dedicated service to farmers, nor any serious disciplinary action for sluggish performance. As a result, despite the abundant network for agricultural extension from the Ministry of Agriculture at the central level to agricultural units at the local level, on an average Nepal serves only 15% and India serves only 6% of the farmers and

their families [6,37,25]. There are more than 3 million farmers in Nepal [38] and more than 119 million in India [39,40].

In the U.S., most extension systems have a local county extension advisory committee (elected by the people), which oversees the extension program and determines the program priorities to ensure that needs of citizens are met. This helps to create accountability because Extension agents have direct association with local needs. Typically their job performance is evaluated jointly by the county extension advisory committee and the extension system at the land-grant university.

Yet, despite a participatory needs assessment and program design approach in place at the local level, the U.S. agricultural extension system has often also been criticized. The criticisms include: lack of timeliness in response to issues, Extension agents' unwillingness to make recommendations (straddling the fence too much), and significant influence in needs identification by the agents resulting in educational programs that are not germane to clients' problems. Thus, clients are often utilizing the expertise of private consultants and firms. For instance, a recent survey conducted in Iowa found that less than one-third of the citizens utilized the services of Iowa State University Extension [41].

Small farmers in the U.S. also did not feel extension services met their needs. According to [42], small farmers constitute 91% of all farms and 23% of agricultural production; yet their interests and needs did not align with the services being provided through the county extension services. One of the reasons for this may be that extension agents often use contacts with progressive large farmers as a prime strategy to implement educational programs [43].

Small farms are those producers with limited resources including land, capital, skills, and labor. In many communities, small farmers have varied information needs and are seeking educational advice for products being raised under variable circumstances [44,45]. Agricultural extension around the world shows similar characteristics in the face of service delivery to small farmers. Authors [46] found that small farms in Latin America, Asia and the Pacific, including Nepal and India, face challenges in the access to extension services and productive resources. They [46] further added that despite the challenges they face to access resources, small farms have proved resilient over time and contributed significantly to agricultural production, food security, and biodiversity conservation. There are more than one million small farms in Nepal, 93 million in India, and 2.1 million in the U.S. [46,47].

Many authors [48,49,50] urged agricultural extension services to adopt appropriate methods when attempting to meet the needs of small farmers, which fall outside the "progressive farmer" category. There are powerful reasons to support small farms globally. As stated by [51], they are economically more efficient relative to large farms, can create large amounts of productive employment, reduce rural poverty, support a more vibrant rural nonfarm economy and help to contain rural-urban migration.

4.5 Objective 5: Current Situation and Future Direction

For more than a century, the purpose, vision, and values of the U.S. Extension System are guided by land-grant mission-'practical applications of research based knowledge by the citizen'. After being self-sufficient in food supply for their citizens, the U.S. agricultural extension is now focused on market-driven agricultural production for commercialization and export. It is working towards developing environmental leadership among the community

citizens [e.g.,52]for which, it implements programs that lead to sustainable natural resources such as water quality, crop nutrient management, food safety, organic farming, and application of nanotechnology in agriculture.

The U.S. Extension is now geared toward building its capacity to provide agricultural extension services to international communities and meet the needs of global agriculture and food securities. As characterized by small land holding, subsistence farming, and little use of mechanization, Nepali and Indian Extension systems are still focused on meeting the food security needs of people. Agricultural extension in Nepal and India also struggle to depict a best extension approach that meets needs of people at grassroots.

With the help of donor supported projects, Nepal and India have been continuously experimenting for an appropriate extension model and have adopted varieties of approaches in their agricultural extension systems. Some of the approaches practiced in the past few decades were training and visit system, integrated rural development, block production program, farming system research/extension, participatory extension approach, pluralistic agricultural extension, farmer field schools, and group approach to extension program delivery. Today, the agricultural extension systems both in Nepal and India are working towards sustainable soil management practices, integrated pest management through farmer field schools, and use of information and communication technologies for disbursing extension information. Most of these projects are supported by international donors.

5. CONCLUSION

Differences were observed in the area of extension models, program delivery, outcomes assessment and research–extension interface among agricultural extension systems compared in this study. In Nepal and India, perhaps because of the nature of the evolution of the system and the lack of participatory input from farmers, it has created a top-down approach. Donor input is helping to shape and change that approach. The weak research – extension linkage in both countries resulted in producing information that were not relevant to the needs of clients at grassroots. In the U.S., while there is closer alignment between research and extension, many Extension leaders observed lack of programming integration between these two entities. This might have resulted into a perceived lack of timeliness in meeting the needs of clients.

In all three countries many small scale-farmers felt underserved and disengaged from their extension services. Needs were also found not–aligned to the extension services offered by all, suggesting a lack of appropriate extension leadership. It was found that only small segment of the extension audience were served in comparison to the large number of farmers and their families residing in these countries.

In Nepal and India, extension agents lacked professional commitment to serve farmers and were mostly accountable to their managers. It appears that there is neither reward for extension agents for their dedicated service to farmers, nor any serious disciplinary action for sluggish performance. On the other hand, there was lack of proper supervision by the Ministries of Agriculture to make sure that extension managers are accountable to meet the needs of citizens at the grassroots.

All the systems need to ensure that they are meeting both the perception and realities of their clients. Clients and taxpayers need to feel there is a public value for the extension systems. Author [30]outlined areas that public organization leaders need to address in order

to create public value, which [53] categorized as (1) Services - cost effective provision of high quality services; (2) Outcomes-achievement of desirable end results; and (3) Trust-between citizen and extension service provider.

6. IMPLICATIONS AND RECOMMENDATION

Results of this study have implications for training of extension agents in their role as facilitators and in respecting farmers' experiences for successful agricultural development in stated countries. Findings also suggest the opportunities for all to work in partnership in the area of developing guidelines for reaching small farmers and identifying means to serve increased number of extension audience.

A partnership with U.S. Extension system for extension programming, training of extension agents, developing better research–extension interface, and utilizing the resources of publically funded universities in Nepal and India can help to play significant role to improve their extension systems. A strong research-extension linkage helps broaden understanding that how research and extension efforts can be applied for public benefits and community development.

With a reliable monitoring system in place, India, Nepal and the U.S., need to ensure they are meeting the needs of their extension audience. It is suggested that extension leaders in India and Nepal, need to strive for standard job performance of extension professionals through policy, training, motivation, and incentives or by other means.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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