

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

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 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 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 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, and 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

23 production and processing, facilitating access to markets, organizing producer groups, and
24 working with growers toward sustainable natural resource management [3].

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

32 There are notable differences in the agricultural extension systems operating around the
33 globe. Reviewing these differences provides opportunities for learning from each other and
34 exploring ways to identify possible avenues for improved extension services. This paper
35 focuses on the agricultural extension systems in Nepal, India, and the United States (U.S.).
36

37 **2. PURPOSE AND OBJECTIVES**

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

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

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

49 **3. METHODS**

50 A comprehensive review of literature was conducted to identify the similarities and
51 differences in the agricultural extension systems in the stated countries. Relevant documents
52 used included creation legislation for each country, global analysis from organizations such
53 as Food and Agricultural Organization, and peer reviewed journal articles.
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56 The comparison of agricultural extension systems was further validated with agricultural
57 extension specialists in these countries. Additionally, the authors have a total of more than
58 45 years of combined working experience in the extension systems in Nepal, India, and in
59 the U.S. Their experiences and views provided inputs to develop this paper.
60

61 **4. RESULTS AND DISCUSSION**

62 **4.1 Objective 1: History and origin of agricultural extension systems.**

63

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

70 In India, a central department of agriculture was established after the 1866 Orissa famine. In
71 1905, the government of India passed a legislative order to have an agriculture director in
72 each state to advise farmers for better agriculture [8]. As a planned effort during the early
73 post-independence period, India began a community development program in 1952,
74 followed by the national extension service in 1953 [9]. These programs were able to educate
75 farmers to take up improved methods of farming across the country [10]. Today, each district
76 has a department of agricultural extension.

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

84 Roots of the U.S. agricultural extension go back to the 1862 Morrill Act and the creation of
85 the land-grant university system to 'educate citizens in practical agriculture'. The outreach
86 mission of the land-grant institution was further expanded by the passage of the Smith-Lever
87 Act of 1914, which created the Cooperative Extension Service (CES) manifest through the
88 land-grant university in every state. The mission of the CES is to 'take educational resources
89 of the university to the people where they live' [14]. Today, the U.S. agricultural extension in
90 each state continues to be managed by land-grant universities.

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

99 **4.2 Objective 2: Models of agricultural extension and program delivery mechanism.**

100 In Nepal and India, the agricultural extension service is run by the ministry of agriculture as
101 one of the public services to farmers and their families. The government develops a five year
102 plan which sets the priorities for the extension. These priorities are based on the national
103 strategy as identified by the government. It has been our observation that process of
104 determining priorities is not inclusive or sufficiently participatory of all stakeholders especially
105 farmers. In Nepal, the District Agriculture Development Office with Agriculture Service
106 Centers at the local level implements extension programs. In India, District Department of
107 Agriculture with Mandal agricultural units (comparable to a county in the U.S.) provides
108 extension services to farmers at the local level. In both countries, the agriculture extension's
109 work at the grassroots is tied to the national target of agricultural development focused

110 mainly on food security; however, achieving food and nutrition security still remain a
111 challenge [15,16,14].

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

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

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

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

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

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

171 **4.3 Objective 3: Existing research-extension interface.**

172 In Nepal and India, research and extension are governmental entities, independent of each
173 other, have different foci, and are influenced by donors' grant and loan policies. The subject
174 specific front-line extension agents are housed in the district extension offices and the
175 subject-matter specialists are located in the research stations. Due to weak research-
176 extension linkages, research generated information is not always relevant for extension
177 [6,35]. The agricultural universities are not a part of the government's national extension and
178 research network because they are housed under the ministry of education.

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

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

196

197 **4.4 Objective 4: Staff trainings and their performance appraisal.**

198 The agricultural extension programs in Nepal and India are implemented by district level
199 extension offices. Extension agents implement programs as their targeted responsibilities
200 assigned by Extension managers. These agents are mainly accountable to their managers,
201 as their manager is responsible for evaluating the performance of an extension agent, not

202 the farmers or any other publicly elected committees, as in the U.S. [36,26]. It does not make
203 much difference to extension agents whether or not they properly implement the program, so
204 long as their managers are happy with them [26].

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

217 According to [26], extension agents in emerging countries have grown up in an environment
218 where there is neither reward for dedicated service to farmers, nor any serious disciplinary
219 action for sluggish performance. As a result, despite the abundant network for agricultural
220 extension from the ministry of agriculture at the central level to agricultural units at the local
221 level, on an average Nepal serves only 15% and India serves only 6% of the farmers and
222 their families [6,37,25]. There are more than 3 million farmers in Nepal [38] and more than
223 119 million in India [39,40].

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

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

238 Small farmers in the U.S. also did not feel extension services met their needs. According to
239 [42], small farmers constitute 91% of all farms and 23% of agricultural production; yet their
240 interests and needs did not align with the services being provided through the county
241 extension services. One of the reasons for this may be that extension agents often use
242 contacts with progressive large farmers as a prime strategy to implement educational
243 programs [43].

244 Small farms are those producers with limited resources including land, capital, skills, and
245 labor. In many communities, small farmers have varied information needs and are seeking
246 educational advice for products being raised under variable circumstances [44,45].
247 Agricultural extension around the world shows similar characteristics in the face of service
248 delivery to small farmers. [46] found that small farms in Latin America, Asia and the Pacific,

249 including Nepal and India, face challenges in the access to extension services and
250 productive resources. [46] further added that despite the challenges they face to access
251 resources, small farms have proved resilient over time and contributed significantly to
252 agricultural production, food security, and biodiversity conservation. There are more than
253 one million small farms in Nepal, 93 million in India, and 2.1 million in the U.S. [46,47].

254 Many authors [48,49,50] urged agricultural extension services to adopt appropriate methods
255 when attempting to meet the needs of small farmers, which fall outside the “progressive
256 farmer” category. There are powerful reasons to support small farms globally. As stated by
257 [51], they are economically more efficient relative to large farms, can create large amounts of
258 productive employment, reduce rural poverty, support a more vibrant rural nonfarm
259 economy, and help to contain rural-urban migration.

260 **4.5 Objective 5: Current situation and future direction.**

261 For more than a century, the purpose, vision, and values of the U.S. Extension System are
262 guided by land-grant mission -‘practical applications of research based knowledge by the
263 citizen’. After being self-sufficient in food supply for their citizens, the U.S. agricultural
264 extension is now focused on market-driven agricultural production for commercialization and
265 export. It is working towards developing environmental leadership among the community
266 citizens (e.g., [52]) for which, it implements programs that lead to sustainable natural
267 resources such as water quality, crop nutrient management, food safety, organic farming,
268 and application of nanotechnology in agriculture.

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

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

286 **5. CONCLUSION**

287
288 Differences were observed in the area of extension models, program delivery, outcomes
289 assessment, and research–extension interface among agricultural extension systems
290 compared in this study. In Nepal and India, perhaps because of the nature of the evolution of
291 the system and the lack of participatory input from farmers, it has created a top-down
292 approach. Donor input is helping to shape and change that approach. The weak research –
293 extension linkage in both countries resulted in producing information that were not relevant
294 to the needs of clients at grassroots. In the U.S., while there is closer alignment between
295 research and extension, many Extension leaders observed lack of programming integration

296 between these two entities. This might have resulted into a perceived lack of timeliness in
297 meeting the needs of clients.
298

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

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

310 All the systems need to ensure that they are meeting both the perception and realities of
311 their clients. Clients and taxpayers need to feel there is a public value for the extension
312 systems. [30] outlined areas that public organization leaders need to address in order to
313 create public value, which [53] categorized as (1) Services - cost effective provision of high
314 quality services; (2) Outcomes - achievement of desirable end results; and (3) Trust-
315 between citizen and extension service provider.

316

317 **IMPLICATIONS AND RECOMMENDATIONS**

318

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

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

330

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

335 **COMPETING INTERESTS**

336

337 There are no competing interests for authors.

338

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