RESEARCH PAPER

Comparative Analysis of Agricultural Extension Services System of the South Asia Region (Nepal, India, and Sri Lanka)

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Abstract

This paper aimed to compare the aspects of Agricultural Extension Services Systems (AESS) in South Asian Regions: Nepal, India and Sri-Lanka by applying the systemic comparison and best fit frameworks. It also aimed to describe the general features of the three countries that influence the agricultural extension system in practice as well as to identify and to compare agricultural extension approaches implemented in the identified South Asian regions including its patterns, and trends of the practices and issues in extension.The South Asia region has a very notable increase in economic growth in recent years. Food security being the backbone of every country's prosperity and well-being has been challenged by the rapid growth of population among the three South Asian countries involved in the study (India, Nepal, Sri-Lanka) with the highest number of concentrations of undernourished and poor people. Agricultural extension is one of the most important keys to advancing innovation and development in rural areas (Davis et al., 2016). In many developing countries, particularly in India, Nepal and Sri Lanka, establishing standardized, location specific and combined extension approaches for an efficient and effective extension system can stimulate enhancement, capacity building, increased technology adoption and improved agricultural outcomes. Also, this necessitates considering the contextual factors such as the policy environment, market access, beneficiary characteristics, and weather conditions. These different aspects of the best fit framework can be applied as a solution to design advisory services and establish causal relationships among the characteristics of the South Asian Agricultural Extension.

Hence, comparative analysis is a useful method in enhancing our understanding of the structures and systems that heightened awareness on the issues related to extension practices. This widens our perspective in analyzing food security issues and how extension approaches are able to solve challenges. Moreover, this can provide relevant knowledge to the agricultural extension agents with the actual review of the country/intercountry/region with application of the different extension approaches geared towards the provision of efficient, effective and sustainable extension interventions for an inclusive and holistic economic progress and development in the South Asia Region.

Keywords: *AES, Pluralistic Extension System, Extension Service Providers, Training and Visit, Best-fit framework*

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I. Background of the Study/Rationale

South Asia occupies three percent (3%) of the world's land area. The region has an approximate population of 1.9 billion people, making it the most densely populated place on earth and is dominated by the Hindu population and millions of Muslims (Rodgers, 2019).For the past years, the region experienced a sustained period of robust growth which lifted up poverty and notable paces in education and health. According to the World bank reports from 2013 to 2016, the South Asian Region has grown from 6.2% to 7.5% compared to other developing nations. It was further estimated that there was an increase of growth for the upcoming years up to 6.7 % in 2021. However, agriculture in the SAR (South Asian Region) has been challenged with low productivity of staple food, shortage of supply, high prices and low returns to farmers. These different variables can be a threat to food security in the region (Surabhi and Deepti,2009).

In South Asia, agricultural development remains an important component of alleviating poverty and food security (Mittal and Sethi, 2009). Agriculture is considered as the mother of all industries as it is the source of all the raw materials used by the other

industries. Agriculture remains the backbone in the region not only provides food and nourishments to South Asian people but serves as a primary source of livelihood for millions of people in the region. However, the region has the highest number of undernourished (299 million) and poor (40%) people which mostly reside in rural areas. With a population of almost 1.9 billion, making the region a densely populated place on earth. The failure in reducing the highest number of undernourished remains a major concern in the region. The Food and Agricultural Organization (FAO) estimates that the South Asian Region will contribute to almost two thirds of the world's undernourished in the next decade (Surabhi and Deepti ,2009).

India showed growth in their economies and enhanced production capabilities, but experienced a weakening economy due to inflation of the food industry and declining oil prices etc. In recent years, Nepal had robust growth of agricultural products, particularly in the rice commodity. However, due to the 2015 earthquake that devastated the country, Nepal has experienced a weakening economy. On the other hand, Sri Lanka also experienced economic collapse in 2019, due to a growth in services, agriculture, and construction (Seth, 2020).

These three developing countries under the South Asian region have implemented structural adjustments that have made them reduce public spending on services. Nevertheless, fostering educational activities and enhancing extension services by applying different extension methods and approaches urge the countries to pay attention to poverty alleviation and food security .

The Context of Agricultural Extension System in South Asian Countries (India, Nepal and Sri-Lanka)

In India, Extension played a significant role in developing agriculture, particularly during the period of the green revolution. These initiatives placed India as the second-largest agricultural producer, particularly rice and wheat commodities, the top export products, and the most important crop in India. Other crops include sugarcane, vegetables, spices, coconut, tuber crop, oilseeds, cotton, tea, rubber, and jute. These also made the agricultural sector from food deficiency to self-sufficient in feeding the growing population (GFRAS, 2012). Thus, the green revolution in India brought a significant impact to Indian agriculture, increasing agro-products and economic development. The impressive increase of agricultural products reduces the level of poverty. However, poverty reduction is not fast enough, which remains primarily rural .

In Nepal, it has a vital role in improving farmers productivity (Adhikari,2016). The Agricultural Extension system in Nepal is decentralized in nature, demand driven and was implemented in a participatory manner (Ghimire et al., 2021; Dhital, 2017). Its extension services are stable but stationary. Linkages between research, extension and training institutes are not strong (GFRAS, 2021).

Sri Lanka AESS are faced with several challenges and constraints. AESS has been perceived to be the knowledge providers of Sri-Lanka's farmers which enable them to improve their own farming system for an increase and sustainable productivity. Historically and dominantly adopted, Sri Lanka AESS are still conceptualized as a diffusion support process being always considered as a linear process with its supply-driven or top down by design. Its AESS started with only a small number of Agricultural Instructors (AIs) in the 19th century. Plantation agriculture was then the focus of the Department of Agriculture in 1912 with the AIs as the frontline extension workers. Extension officers before were those individuals who finished a one-year training course at practical farm schools. Extension activities were expanded beyond rice crop when the Division of Agriculture Extension was created within the Department of Agriculture in 1963.

Thus, a need to analyze certain aspects in the South Asia Region AESS by applying the best-fit approach in order to provide a holistic insight and practical actions for improving the delivery of services not just in this region but to other parts of the globe is deemed necessary.

II. Study Objectives

To offer a basis for comparative analysis, this study has looked into some details of the different aspects of Agricultural Extension System in South Asian Region by applying the systematic comparison using the best fit-framework including the issues in the Region's agricultural extension system and different extension approaches and methods that have the greatest possibility for increasing food security, hunger reduction and economic growth.

Specifically, the study aimed to achieve the following:

a. Compare the aspects of Agricultural Extension Services Systems (AESS) in

South Asian Regions: Nepal, India and Sri-Lanka by applying the systemic comparison and best fit frameworks

b. Describe general features of the three countries that influence agricultural extension system in practice
c. Identify and compare agricultural extension approaches implemented in the identified South Asian regions including its patterns, and trends of the practices and issues in extension.

III. Methodology

This study made use of the secondary data and information provided by Global Forum for Rural Advisory Services(GFRAS) and other sources from different journals and publications. The major discussion of comparison in this paper is based on the "best-fit framework" developed by Birner et al. (2009) that presents a conceptual framework which can be applied as a solution to design advisory services. Through this analytical tool, this has helped in establishing causal relationships among the characteristics of the South Asian Agricultural Extension Services (AESS).

Specifically, this has an in-depth focus on describing the sets of frame conditions such as: (1) cross-cutting issue, (2)governance structures, (3) capacity,(4) management and organization, and (5) advisory methods and extension approaches used in the delivery of agricultural extension services in these 3 South Asia countries namely Nepal, India and Sri Lanka. Having used the different sources of secondary data has enabled us to identify issues on each set of frame conditions of these countries. These were discussed comparatively and were highlighted to gain better understanding of the AESS trends and have enabled some recommendations of the best fit-frame of AESS not just in this region but to other regions around the globe that could derive similarly the best practices in AESS.

III. Results and Discussions

This section shows the aspects of comparison of the Agricultural Extension Services Systems (AESS) in South Asian Regions: India, Nepal and Sri-Lanka using the best-fit framework.

A.Cross-Cutting Issues

This paper has focused specifically on the food security issue experienced in Nepal, India and Sri-Lanka of the South Asia Region.

Agricultural Production

According to the World Bank (2017), about 80% of the impoverished population in the world are largely dependent on agricultural related activities as a source of livelihood. Improving agricultural production is seen as one of the most important tools in addressing hunger and poverty (Maulu et al., 2021).

India is an agrarian rural economy where most of its population is engaged in agriculture as a source of livelihood (Nandi and Nedumaran, 2019). In a predominantly rural economy, most of the Indian rural households are highly dependent on agriculture and increasing productivity and nutritional security was considered the major challenge of indian government. Although India has the fastest growing economy in the world, it faces severe challenges because of the ever-increasing population, limited availability of water and land which is exacerbated by the degradation of natural resources (Papnai et al., 2013). In meeting the above challenges, a need to strengthen the agricultural extension services towards increasing income in rural areas remains crucial in the country.

India being the largest producer of food in the world, still the condition is not sufficient in meeting the basic food requirements of the people. Consequently, many Indian people strive hard even for square meals (Jaswal, 2014). Approximately 55% of India's population, accounting for 16.5% contribution to its annual GDP.

In similar manner, Nepal agriculture provides livelihoods for almost 68 percent of the country's population.Nevertheless, Nepal struggles in meeting the demands of the people and that is to have a better supply of food and access to a better market (USAID, 2020). In the 1960s, the cereal yield in Nepal was 198% higher than any other South Asian countries in the region. Nowadays, Nepal is comparatively producing lower yield of wheat, rice and corn commodities (Shrestha, 2018). The USAID's Office of Food for Peace (FFP) in Nepal underpinned the non-governmental organizations that manage agricultural extension activities and improving food security in the country.

In Sri-lanka, agriculture is also considered as the most important sector of the economy. Even though its contribution to the gross domestic product declined substantially during the past 3 decades (from 30 percent in 1970 to 21 percent in 2000), it is still the most important source of employment for the majority of the

Sri Lankan workforce. Approximately 58.24% percent of Sri-Lanka's population ,accounting for a 7.42% contribution of its annual GDP.

Food Security Status

Food security, as defined by the Food and Agriculture Organization of the UN (FAO, 2001) is a situation that exists when people have better access to a safe, sufficient food source that meets their dietary requirements. . FAO (2009) has identified the four basic pillars of food security such as: food availability, food access, food use, and food stability.

From many perspectives, agriculture in any country today is in a state of crisis. India, Nepal and Sri-Lanka predominantly an agricultural country has been challenged by its large population. Unfortunately, aiming for food self-sufficiency could be a daunting task in this country if the issue has not been given priority attention by the government.

Based on the 2020 result of the Global Hunger Index (GHI) India ranks 94th out of 107 countries with a score of 27.2. India has a serious level of hunger. In Nepal ,it ranks 73rd with a GHI score of 19.5 (moderate level) while Sri Lanka ranks 64th with a GHI score of 16.3 (moderate level) (GHI Index,2020).

India is facing poverty due to its increasing population, and the existence of food insecurity in the country has remained formidable. According to Jitendra (2018), India is home to over 270 million hungry people, and stands 97th in Oxfam's Food Availability Index.

Based on the Agriculture Ministry Data, India exported 20.4 million tons of agricultural products in 2015-2016, and 22.3 million tons in 2017-2018. The economic survey of 2018 annual report states that the net availability of food grains remains stagnant and there is a low availability of food and nutritional intake remains upsetting in the country. Reports from the United Nations organizations show that the prevalence of food insecurity increased by 3.8 percent between 2014 and 2019.

On the other hand, Nepal is one of the poorest countries in the region with a Human Development Index (HDI) score of 0.574 in 2019 (WFP, 2019).According to the Zero Hunger Strategic Review (ZHSR) in 2017-2018 found that Nepal significantly enduring from severe malnutrition and food insecurity. Consequently, the multitude of young children , and adolescents suffered from malnutrition. Based on the report from the Nepal Multiple Indicator Cluster Survey in 2014, about 37.4% Nepalese children have stunted growth and 11.3% have severe malnutrition resulting from chronic diseases. In recent years, there has been an improvement of food availability in the country. However, according to the Nepal Demographic and Health Survey (DHS) conducted in 2016 , there were about 4.6 million people experiencing food insecurity. Results of the survey shows that the majority of the rural households in Nepal were food insecure and the majority of the food products have higher prices in the market.

In Sri Lanka, food insecurity was also a prevalent issue in the country. The World Food and Agricultural Organization (FAO) asserts that food insecurity will lead to malnutrition and many people particularly in rural areas will experience hunger . Nevertheless, food insecurity will hinder the economic development of the country. Results from the Global Hunger Index (GHI) estimates around 795 million people suffered from food insecurity resulting from stunted growth of small children and chronic nutritional deficiencies which are the common effects of food insecurity (FAO, 2016).

Reasons for food insecurity in South Asian Region

Malnutrition in the three South Asian countries (India, Nepal, Sri-Lanka) remains high as the major consequence of food scarcity. In India, the limited land to expand cereal production, unavailability of water which is worsen by the degradation of natural resources, inadequate food supply due to mismanagement of food products and poor storage facilities of food grains which gives little protection from humidity and pests including diversion of cultivated land towards wood farming (furniture, timber, pulp and paper) are among the factors which contributes to food unavailability . Moreover, the Covid-19 Pandemic also causes economic distress which affects the country's food security.

Food security status in Nepal was intensified by domestic causes and external factors such as poor governance, armed conflicts, and the interest of developing trade regulations and investments of other developing countries (Panday, 2009).In addition, the multidimensional nature also contributes to poor nutrition and food insecurity in the country.The susceptibility to natural disasters, such as drought, earthquakes, floods, landslides, vulnerability to fluctuations in global prices, civil unrest, also with pandemic disease like COVID-19, endemic disease like dengue and poor infrastructure drive food insecurity in the country.

Accordingly, in Sri-Lanka, the unavailability of food was due to environmental factors such as global warming and climate changes. This implies the fact that increasing food availability in the country is not sufficient unless it satisfies other conditions such as food access, stability and affordability. Moreover, the susceptibility to natural disasters, such as drought, earthquakes and other calamities and the recent COVID-19 pandemic drives also the country;s food insecurity.

Table 1 shows some information regarding food security as a cross-cutting issue in India, Nepal and Sri-lanka in terms of its status, agricultural production, factors of food scarcity and its consequences.

Table 1. Food security as a cross-cutting issue in the South Asia Region

Cross-Cutting Issue (Food Security)	India	Nepal	Sri-Lanka
Food Security status	- Rank 94th out of the 107 countries in 2020 with a GHI score of 27.2 (serious level) -Facing poverty due to its increasing population, and the existence of food insecurity at the micro-level in the country has remained formidable - food accessibility remains poor over the years, nutritional intake remains disappointing in the country -food insecurity increased by 3.8 percent between 2014 to 2019.	- Ranks 73rd out of the 107 countries in 2020 with a GHI scores of 19.5 (moderate level) - Almost 4.6 million people are food-insecure, 20 percent of households mildly food-insecure,22 percent moderately food-insecure, and 10 percent severely food-insecure,	- Ranks 64th out of the 107 countries in 2020 with a GHI score of 16.3 (moderate level) -Facing poverty due to population growth - Chronically and seasonally food insecure - Proportion of people who cannot afford food is higher than the number of people who are below poverty line
Agri production	-55% of India's population, accounting 16.5% of its annual GDP. --second largest producer of wheat, rice, sugar, groundnut and inland fish	68 percent of Nepal's population, accounting to 34% of the country's GDP. . In 1960, cereal yield was the highest among the South	-58.24 %percent of Sri-Lanka's population ,accounting 7.42% of its annual GDP -Rice is the primary crop and rice farming is an important economic activity

		Asian nations (198 %)	
Drives food insecurity	- Population growth, limited land and water unvailability which is worsen by degradation of natural resources - Mismanagement of food products and it's supply - Inadequate and poor storage facilities for grains, which gives little protection from pests and humidity -diversion of cultivated land towards wood farming	-Population growth ,susceptibility to natural disasters, such as drought, earthquakes, floods, landslides, -vulnerability to fluctuations in global prices, civil unrest, -pandemic disease like COVID-19, endemic disease like dengue and poor infrastructure drive food insecurity in the country	- Population growth, heavy fluctuation of domestic production -Rising of food prices -Lack of fertile land/resources -high rate of poverty and the low purchasing power -seasonal fluctuation in the production of the food - Diversification of food at farm level id limited -Food loss and wastage
	(furniture, timber, pulp and paper) -pandemic disease like COVID-19, endemic disease like dengue and poor infrastructure		- pandemic disease like COVID-19, endemic disease like dengue and poor infrastructure drive food insecurity in the country
Consequences of food insecurity	- Malnutrition is high -Under-nourished, underweight and stunted children of about 39%, and half of India's women and other children are anemic, resulting into maternal mortality and other health problems	Malnutrition remains high	- Malnutrition is high, Stunting and chronic nutritional deficiencies

***B.*Governance Structures**

Table 2 shows the different governance structures of the three South Asian countries.The South Asian region is notable to have a pluralistic agricultural

extension and rural advisory services (GFRAS, 2021). The development and progress of mixed economies has always been the goal of a pluralistic extension system, where the public and private sectors cooperate more closely to safeguard the farming communities (Roy, 2018). This extension system serves as an instrument to attain success in rural development programs in the South Asia region. Nepal, India and Sri-Lanka in this region have a decentralized governance structure that greatly promoted the development of a pluralistic extension system.

In India, implementation of extension programs and activities are the major responsibility of the State Development Departments such as the Departments of Agriculture, having focus on development of agriculture and its allied activities to undertake outreach activities. The effectiveness of the extension system is visible only in the case of the Agriculture Department, which is one of the major implementers of the Training and Visit System (Gowda,2012).

In Nepal control of the organization is decentralized in nature.The Department of Agriculture bears the overall responsibility for the growth and development of the agricultural sector. The agricultural extension activities are mainly influenced by the activities of two (2) departments namely; the Department of Agriculture (DOA) and the Department of Livestock Services (DLS) that emphasizes role of subject-matter specialists in the organization(Food and Agriculture Organization, 2010;Dhital, 2017; GFRAS, 2021;DOA, 2021).

Sri Lanka on the other hand, the Department of Agriculture (DoA) was given control over extension in the interprovincial (IP) areas covered by major irrigation schemes in 1989 as part of the devolution. About 244 extension directors, supervisors, and field extension staff are assigned to these IP areas, which are primarily intensive rice-growing areas. The DoA has also an Extension Training Center (ETC) where 85 professional and technical staff operate four in-service training institutes, four agricultural schools, and four special training centers with an established Cyber Extension system (World Bank, 2007; GFRAS, 2012).

Table 2. Governance structures of India, Nepal and Sri Lanka

Governance Structures	India	Nepal	Sri Lanka
Institutional setup	State Development Departments at National level; with numerous extension providers	DA spearheads the implementation at National level; with numerous extension providers	DoA spearheads the implementation at National level; with only few extension providers
Management of extension services	Top-down/participatory Pluralistic	Top-down/participatory Pluralistic	Tod-down/participatory Pluralistic
Role of service providers	Input supplier, training/info provider/donor/management assistance/program partners	Input supplier, training/info provider/donor/management assistance/program partners	Input supplier, training/info provider/donor/management assistance/program partners
Degree of privatization	Moderate	Low	Low
Degree of decentralization	High	High	High

Funding	Low	Low	Low
Coordination	Strong	Strong	Strong
Linkage	Strong	Strong	Minimal

Leadership in India, Nepal and Sri Lanka is top-down and provided mainly by the government sector organizations. Few Non- Governmental Organizations (NGOs) and private sector deliver extension services to the selected farming communities. The Extension System is called Public- Private-NGO Partnership.

The farmer organizations and agricultural cooperatives, though present in many farming systems, have shown varying degrees of success in mobilizing extension services. For instance, several Community Based-Organizations (CBOs) in Sri Lanka were artificially created for different farming subsectors for the convenience of field interventions by the different development program donors and agencies. However, the existence of these different organizations tends to focus their work in isolation causing extra burden on village leaders and may have lack sustainability. It is then considered important to have their integrated mechanisms for one main CBO to have different sub-committees dealing with different farming sectors at village level.

Financial aspect is likely to be supported by other sources, such as local governments and special authorities/boards. Extension budgets have been kept stable for many years by holding down salary costs and by not filling vacant positions to reduce costs or reallocate government funds to other priorities. About 85 percent of the recurrent budget goes for staff salaries and benefits, leaving very few resources for operational and program costs, with no funds available to fund programs such as an on-farm demonstration, field day, or farmer training course (World Bank, 2007).

Coordination among a large number of national and international NGOs and other development partners of Sri Lanka, Nepal and India is visibly strong as observed in the bilateral interaction among them. This is always facilitated by the national government through the Center for Non-Governmental Sector (www.cngs.erd.gov.lk). Well coordinated meetings and activities are conducted among development partners such as the ADB, the International Monetary Fund (IMF), the Japan International Cooperation Agency (JICA), ADB and the World Bank (ADB, 2021).

Very minimal linkages have been noted in Sri Lanka while India and Nepal have strong linkages that become a big challenge for research and extension at the national and provincial levels. Repairing links requires strong interventions, including a change in attitude and a clarification of the respective roles of research and extension within the system. (World Bank, 2007).

C. Capacity of Service Providers and Skills of Advisors

In the South Asia Region, agricultural extension specialists commonly serve as facilitators in helping the nations to further increase farm household income and hasten economic growth and development.

It is noteworthy to point out the decentralized extension system in India which has an important effect on the motivation, morale of the field extension staff and has a direct positive impact on their performance. For instance, not all farmers can directly use ICT, and many prefer to learn from trusted contact which is necessary to use decentralized outreach systems in bridging the digital divide.

Table 3 shows the management capacity of AESS in Nepal, India and Sri Lanka in terms of the human and organizational competencies and its financial and physical assets.

Table 3. AESS Capacity

AESS Capacity	India	Nepal	Sri Lanka
man & organizational (competencies, motivation)	-Policy guidelines and operational backstopping to the state level extension organizations are provided by the	- International research, development organizations and donors provide support in filling the gap by	-Nice ministries handle extension services with the active involvement of the different NGOs (local and

	(Agricultural Extension division) - Pre-service education in extension is provided and facilities for in-service training of extension staff are available at different institutions such as MANAGE, ICAR,DOA and MOA - Extension services are funded by the national governmen t through MOA and other allied ministries	providing opportuniti es for extension staff to pursuing higher studies and access to training, but limited opportuniti es -in-service training is provided through the Directorate of Agricultur al Training (DAT) under the Departmen t of Agricultur e (DOA) -3% Budget allocation by the governmen t - Allowance s and tokens are available for the field staff	internation al NGOs), farmers-based organizatio ns, cooperative s and companies in funding projects, credit support, farm input supply provision and assistance in marketing manageme nt. -Extension and Training Center of the Departmen t of Agriculture was created for capability enhanceme nt and educational opportuniti es of extension field staff and farmers. Agri-clinic model establishm

			ent to harness ICT skills of farmer organizatio ns.
Financial & physical assets	National governmen t funded	National governmen t funded	National governmen t funded

The agricultural extension services in India, Nepal and Sri Lanka are funded and provided by the national government. In India, the funding is through MOA and other allied ministries such as the Department of Agriculture and Cooperation (DAC), Indian Council of Agricultural Research (ICAR) , Agricultural Extension Division, State Agricultural Universities, National Institute of Agricultural Extension Management (MANAGE), State Agricultural Management and Extension Training Institutes (SAMETI) and Commodity Boards (Singh,et.al, 2013). However, policies and operational backstopping to the state level extension organizations are provided by the directorate (Agricultural Extension division) while pre-service education in extension is provided and facilities for in-service training of extension staff are available at different institutions .

According to GFRAS (2012) the extension providers in Nepal, India and Sri Lanka include the public and private sector. In Nepal, the public sector is represented by the Ministry of Agriculture and Cooperative and two of its technical departments including the Department of Agriculture (DOA) and the Department of Livestock Services (DLS), the Tribhuvan University, other universities and research institutions around the country. These institutions provide extension services through various departments and institutes. Private sector includes the private firms, non government organizations, cooperatives, farmers based organizations and cooperatives. Training agricultural extension professionals in charge of delivering information, new methods and technology to farmers is one critical step towards improving the performance of the agricultural sector. (Musuri and McNamara, 2012).

In Sri Lanka, there are only 2,400 agricultural instructors working in the provincial and interprovincial ranges of the Department of Agriculture (DoA) and other service units (Wanigasundera, 2015). According to the Administration Report of DoA in 2010, the total number of extension staff (technical and management) was only 583 while the support staff (drivers, secretaries, financial and administrative personnel) in extension was 359 (GFRAS, 2012). Field personnel are likely to be paid by the local government. Field personnel require high level training and qualifications to enable them function critically for the application of new knowledge. The conventional system of capacity development of state sector extension personnel in Sri Lanka is through 'In-service Training Institutes' (ISTIs).

D. AESS Management

Management is defined as the process of handling people and making sure things are performed through the people. It is also the process by which all the members, intervention, activities and resources are coordinated in order to achieve the goals set by the organization. Management deals with human behavior, the human interactions and the human relationships in an organization.

Here, basically we study the extension organizations(GFRAS, n.d.). Management is an executive function of the administrator in an extension organization. The administrator carries out a series of management functions (Gulick and Urwick, 1959 in Agriculturistmusa, 2018).The comparison of management in south asia region according to the best fit framework of Agricultural Extension System is shown in the table 4. It includes the Training and Retraining of Staff,Organizational Management Procedure,Incentives & Methods of Performance Assessment of Individual Staff and Monitoring of Evaluation of Services.

It can be gleaned from the table that the Training and Retraining of Extension Staff in the South Asian Region is conducted through in-service Training by the respective offices. The formal training for those who want to have a diploma is provided by a formal training in a university (GFRAS, 2021). According to MEAS(2011) the extension staff in Nepal extension staff is trained poorly and retraining on agricultural production knowledge is needed.

As to the organizational management procedure, the countries in the region (Nepal, Sri Lanka and India) are implementing agricultural extension services in a decentralized manner with a complex extension system (GFRAS, 2021). In Nepal the management of leadership is top down and it is demand driven (Thapa, 2013). The country's leadership is bureaucratic with the central office supervising the policies for the conduct of agricultural extension services by the regional district division(The himalayan times, 2019). Nepal makes sure that the functions and responsibilities on the production are designated to local level provinces with the central office formulating rules and regulation and coordinating internationally (Paudel and Sapkota, 2018).

Table 4. Comparison of Extension Management in South Asia

Management	Nepal	Sri Lanka	India
Training and Retraining of Staff	-Tribhuvan University for formal agricultural training of Extension Agent -In-service training by the (DAT) under the Department of Agriculture (DOA)(GFRAS, 2021). - train poorly with skills and knowledge in agricultural production (MEAS,2011)	-In-service Training Institutes' (ISTIs) manage by central and provincial DoAs manage few ISTIs -pursue degrees or diploma in agricultural extension at the University of Peradeniya and other academic institutions that cater	-Various Institutions are conducting extension staff in service training (Agriculture Extension Division of ICAR,Department of Agriculture and Cooperation , MANAGE, and the ministry of Agriculture)

Organizational Management Procedure	-decentralized control of organization -extension activities are dominated by MoAC	-decentralized control of organization; -complex extension system	-decentralized control of organization; -very complex extension system -participation of rural people is required
Monitoring of Evaluation of Services	-done by extension agent -monthly report is submitted(FAO,2010)	-Research outputs of extension personnel of DoA were presented for debate and criticism in the Annual Symposium of Department of Agriculture (ASDA), (Wanigasundera, 2015).	-block farmer advisory committees (BFACs) and BTTs (at the block level) (IIM) (Singh 2003). -Project directors provides monthly and quarterly reports -ICT infrastructure is used

For Sri lanka, it is observed that the Technical information is decided upon by both people inside and outside the local village. The provision of messages with emphasis on both the technology and quality of life to Sri Lankan farmers is wide ranging to meet the local needs and interests of these clients.As for India reforms in the extension services such as implementing an approaches that are decentralized in nature and demand driven, it was done in order to improve the effectiveness of agricultural extension (IFRI, 2011).

Monitoring and evaluation of services in the South Asia region is primarily done by the agricultural extension agent with the submission of monthly and quarterly reports. As for Nepal extension agents are tasked to perform extension planning, organizing, implementation, monitoring and evaluation. The monthly report will be submitted to the ASC to the district, region and department level with a limited feedback mechanism from the supervisor (FAO, 2010).While in Sri lanka the research outputs of the research personnel and extension services were monitored and evaluated through a discussion in the Annual Symposium of Department of Agriculture (ASDA), it is public discussion platform by which the output of the researcher and extension personnel were subject for debate and scrutinizing (Wanigasundera, 2015).

In India, due to its massive pressure on increasing food insecurity, the agricultural sector in India has been a state responsibility that has undergone several changes and reforms for the effectiveness of its extension service delivery (Singh, 2012). Agricultural Technology Management Agency (ATMA) provided mechanisms in monitoring and evaluating extension programs. It will be mainly performed by the block farmer advisory committees (BFACs) and BTTs (at the block level), ATMA governing board (at the district level), and the state-level sanctioning committee (SLSC). At the national level a monitoring committee and policy committee will review, monitor, and guide the implementation of ATMA at the DAC level (Glendenning, 2014). Directors are required to submit reports which contain information on training participants and ICT are used to monitor activities implemented at the Block-level. Farm School, Farmers Field School and other activities are evaluated through impact assessment. The role of ATMA is much wider than technology dissemination, as it is also supposed to be market-driven (Gowda,2012).

E. Advisory methods and extension approaches

Agricultural advisory methods and extension approaches are increasingly recognized as playing a vital role in improving agricultural growth. Approaches in extension serves as the doctrine of a system as mention by Anandajayasekeram et al (2008) it is a guiding principle that stimulates action which provides a structure on leadership, programs to be implemented, resources to be used and linkages.While Axinn (1988)

compared the approaches to a drummer in a band which is responsible in setting all the activities necessary in a system. Bolinger et al (1994), added that an approach includes a series of steps such as the planning, organizing and management.

In the South Asia region several extension approaches and advisory methods are commonly used to stimulate agricultural services in order to answer food security issues. It was observed that common extension approaches employed by the region are the Training and Visit Approach, Specialized Commodity Approach and the bottom up or participatory approach. Table 6 presents the extension approaches commonly used by South Asian countries in addressing food insecurity.

e.1.Training and Visit

This approach started in the late-1960s as a reform of ineffective general extension services (Alex, Zijp and Byerlee 2001). It was promoted to the developing countries by Worldbank (Anderson et al., 2006). This approach is top- down in nature with a purpose of increasing crop production. Extension agents had a scheduled visit to the farmers with a two way communication but it is costly (Axinn, 1988).

In the South Asia region the T&V extensions were implemented with the support of Worldbank (GFRAS,2021).In India it was implemented in 1974 and became the dominant method (Gowda,2012). In Nepal twenty districts were tested first with the approach in 1975 to 1989 (Yubak, 2019).For Sri lanka it was during the 1980s and early 1990s (GFRAS, 2021).Of the three country it can be seen that earliest to implement the T&V approach is India.

The approach is implemented in India with a goal of changing farmers production technology through research and extension (Gowda, 2012).While in Nepal it was implemented in the 19 districts of Terai to train technicians to train farmers (Davis & Sulaiman, 2016 in Ast et al., 2021). In Sri Lanka, a total 2,400 extension workers in the grassroots level provided services to the farming communities (World Bank, 2007). Extension agents help in technology transfer. The indicators of the success of this approach is the increase in crop production and envisions close links between research and extension (Gowda, 2012; Ast et al., 2021) . T & V is centralized, top- down, rigid, and financially unsustainable because it is costly to hire large numbers of personnel and provide continuous training and management (Ghimire et al., 2021).

Table 6. Common extension approaches in South Asia Region

Nepal	Sri Lanka	India
Training & Visit System	Training & Visit System (1980s-1990s)	Training & Visit late 1974 Hossain et al.,2014
Block Production Program	Commodity Specialized Extension	Commodity Specialized Extension
Pocket Package Approach uses the Bottom-up/Participatory Approach in the process	Bottom-up/Participatory Approach	Bottom-up/Participatory Approach (GFRAS, 2012)
Unique Extension Approaches		
Tuki Approach		ATMA approach

e.2.Specialized Commodity Extension

Another extension approach that is common in the delivery of agricultural extension systems is the Specialize Commodity Extension approach. According to Axinn (1988) it is implemented with the goal of increasing one specific crop or commodity and Alex, Zijp and Byerlee (2001) like application of fertilizer, management of forest, and irrigation. Personnel are highly trained and it is costly. For Hanyani-Mlambo (2002) It involves a set of extension guidelines to increase income in livestock in dairy production for export.

Presently, extension approaches in Sri Lanka are top-down and commodity specialized extension services. These are primarily provided to the tea, rubber, coconut

and cashew sectors (Hossainet al., 2014). In Nepal this approach is present with the implementation of the Block Production Program with the main purpose of increasing farming productivity through a package of technology of one crop (Dhital, 2017). This is successfully implemented in India with the Gujarat Cooperative Milk Marketing Federation. It has 2.8 million milk producers to provide milk for the villages and the whole country.The federation existed over 35 years in 2010 (Mapiye et al., 2021).

e.3.Bottom up Approach(Participatory Approach)

The Third extension approach commonly implemented by the South Asia Region is the Bottom up or Participatory extension approach. Axinn (1988) explained that this approach assumes that the farmers are knowledgeable enough and with the skills set in the production of crops. While Alex, Zijp and Byerlee (2001) explained that this approach uses the farmers' own capacity in the planning and implementation of the extension services in order to improve productivity. The extension workers serve as facilitators (Axinn, 1988;Alex, Zijp and Byerlee, 2001) in the field.

In terms of extension service delivery in India, participatory approaches are considered to be useful instruments for increasing the productivity and efficiency of the agricultural and rural sector by establishing a decentralized, bottom-up, demand-driven, and financially sustainable technology development and dissemination system (Raabe, 2008). However, the success of the use of this approach is dependent on the effectiveness and strong linkages between farmers, research, and extension, as well as effective communication of problems and solutions.

A Participatory Technology Development (PTD) approach was also adopted when Sri Lanka benefitted from the North-Western Province Dry Zone Participatory Development Project 1993 which was funded by the International Fund for Agricultural Development (IFAD) and the Government of Germany (GFRAS, 2012).

While in Nepal the projects that are developed under this extension approach use the bottom-up process in order to identify the selected commodities which is called as the Pocket Package Approach this approach is implemented in a selected area where the production of the livestock is through a participatory or bottom up approach. According to (Ast et al., 2021) this approach is effective to introduce new demand-driven technologies. It has also been instrumental in commercializing agricultural commodities such as crops, dairy, and off-season vegetables as it helps with increasing the scale of production. One good example of this approach is the Farmers Field School on the selection of seeds and multiplication project, it increases the farmers yield to 45% in the country which improves the access to food (Mapiye et al., 2021).

Unique Extension Approaches Implemented in Nepal and India

The Tuki Approach of Nepal

This extension approach was introduced in 1977 by the project of Swiss- Integrated Hill Development focused on assigning extension functions to locally rooted volunteer farmers. Those farmers were also working as agriculture input dealers, so that the technological message could go along with inputs required (Ast et al., 2021). This system serves as a way of communication between extension agents and the farmers. Volunteers “Tuki” are trained for 15 days initiated by the Department of Agriculture (FAO, 2010). Tukis will maintain a demonstration farm and are paid by the people to trainthem with modern technology (Yubak, 2019). The main goals of this approach is to improve farm productivity and capacitate volunteers for information dissemination and in the delivery of extension services(FAO, 2010).

ATMA (Agricultural Technology Management Agency) of India

In 1998 the National Agricultural Technology Project (NATP) was established by the World bank and ATMA was born out of it (Singh et al., 1978), it was launched last 2005-2006 as one of the reforms in extension at the district level. Participation of farmer organizations and NGO are evident (GFRAS, 2021). ATMA approach coordinates activities and facilitates linkages between research, extension, and private sector. It was introduced at the district level and noted that ATMA in Hindi means “soul”; therefore, engaging small farm households in this new approach was viewed by some as being the soul of agricultural development (FAO,2008; Swanson et al., 2014). This approach was based on decentralized or bottoms up management and used participatory extension methods and considered the participation of different stakeholders in finding ways to increase farm income. According to Swanson (2014), for this approach to work, various groups of farmers, including farm women, had to get organized into

producer groups (social capital) to link more efficiently into supply or value chains that serve different markets. According to FAO (2008) ATMA is implemented in 614 districts in 28 States and 3 UTs in India.

One of the major partners in implementing programs and services in addressing food security issues in the Indian context was the Department of Agriculture. It served as a bridge and instrument on establishing the link between agricultural research and different stakeholders of the program. The said department is a nodal agency that implements the T and V system approach, Integrated Rural Development Approach, Bottoms up approach, and the Agriculture Technology Management Agency (ATMA) approach, which coordinates activities and facilitates linkages between research and extension private sector.

e.4..Information Communication Technology (ICT)

ICT includes the use of gadgets such as cellphone, television and computers (Toluwase and Apata, 2017; Rohila et al., 2017). Information Communication technology mainly focuses on enhancing agriculture sector and rural development by improving the communication processes (Deepa et al., 2018). In South Asia region ICT initiatives in extension were implemented under the Ministry of Agriculture with a primary purpose using it as a means of communication and dissemination tools in order to improve farm productivity thus increase farmers income.

As for ICT use in Indian agricultural extension services, there were three notable initiatives, the digital Green, eChoupal, and the e-Extension Centre based in Tamil Nadu Agricultural University (TNAU). These three ICT initiatives use a hardware and software technology platform that is accessible in areas with no electricity and internet connection to disseminates knowledge and scientific information to address the interests and needs of the community and facilitates the sale of farm inputs including the purchase of farm produce through village Internet kiosks (Deepa et al., 2018)

Likewise, cyber extension as an ICT initiative was developed in Sri Lanka under its Ministry of Agriculture and the Department of Agriculture (GFRAS, 2012; Wanigasundera, 2015). This was realized to meet farmers' demand for new information (Toluwase and Apata, 2017). Most of the farmers studied by Malsha, Jayasinghe and Wijeratne (2011) used ICT to acquire farming information like new technologie in cultivation. Control on pests and diseases and chemicals. Using these tools has indeed some improvements on farmers' knowledge to reduce pests and diseases.

In Nepal, modern technology information and practices were disseminated by Agricultural Information and Communication Center (AICC) through a mass media (GFRAS, 2021;Khan et al., 2017). A radio program in Nepal broadcasted daily from 15 minutes and a national television program is aired at 6:40 in the evening (NDRI, 2015). The usage of communication technology and internet in the country is still low even though they have access to computers due to unstable internet connection. Emails are only used for communication purposes and not dissemination (GFRAS, 2021;NEFAS, 2004).

Moreover, Information Communication Technology (ICT) was also disseminated to the farmers and helped in strengthening the capacity of farming communities through updated information and wide networking services. With ICT applications, farmers can be updated with the recent details on agriculture, leading to increased farm productivity (Singh et al., 2017). FAO added that ICT in agriculture is transformative. Information and communication technology (ICT) is used in agriculture to allow information generated by researchers to be more efficiently accessed by extension staff and transferred to farmers (FAO, 2010).

IMPLICATION AND CONCLUSION

The agricultural extension system and services (AESS) are strategically considered in the practice and continuous adoption especially in these 3 countries namely Nepal, India and Sri Lanka in the South Asia Region. These AESS are strategically adopted to address the challenges in the agriculture sector and to enable these countries to attain livelihood improvement and elevate their economy for better standards of living.

Agriculture sector is ultimately considered as the main pillar of the economy mostly in the South Asia region. Agriculture continues to be the mother of all industries, providing each person with food, clothes, shelter, and byproducts to live. Its success depends greatly on some factors particularly the agricultural extension system & services (AESS), environmental and agricultural policies and standards and the coordinated involvement of extension and service providers from the public and private sectors. Since AESS in the three

countries focused in this study have been established decades ago, the extension approaches used as well as the service coverage have always remained top-down, supply driven and at times, necessitate pluralistic extension system to address the financial, human, material and other social resources for a successful and sustainable extension.

Moreover, limited financial resources has been a common reason for having limited and even unsustainable extension programs and services. Hence, a combination of various extension approaches is adopted among the 3 countries being focused in this study that best fit the political and economic systems. Extension Approaches must be evaluated in order to improve the implementation of the AES that will be strategically adopted and sustainably practiced. As to the leadership system, a bureaucratic management is patterned according to its political and economic systems. Top-down approach is still dominantly observed and a pluralistic type of extension is always encouraged to cope with the region's limited resources and advisory services in promoting food security and sustainability in the South Asia Region.

Comparative analysis provides several important functions that are closely interlinked. The use of this as a research method has enhanced the researchers in dept understanding and has increased familiarity on the given structures and systems which heighten our awareness on the issues related to extension practices in the South Asian countries (India, Nepal and Sri-Lanka),and allow us to widen our perspective in analyzing the food security issues . In addition, it enhanced the knowledge of the agricultural extension agents with the actual review of the country/intercountry/region with application from the different extension approaches .

The use of the best fit framework to analyze aspects in the South Asian region's agricultural extension services system provides us a holistic insight and practical actions for improving its service delivery in the application of different extension approaches.

This further provides thematic analysis on the approaches implemented in the South Asia Region which in turn helps to identify the problem and hopes to provide more information for the policy maker to improve the extension delivery system.

With the use of this analytical tool in analyzing the AESS, the pluralistic and other participatory extension approaches being adopted in the South Asia Region still need to be studied to consider other factors to enhance a greater and even a more inclusive and sustainable extension system that promotes strong partnership, coordination and active participation of agricultural extension stakeholders. Also, specific extension programs and approaches at national, sub-national and international levels have to be compared at how these are implemented specifying the factors contributing to its success which may serve as a guide and schematic pattern for a wholesome and successful extension systems in the region.

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