

The agricultural value-chain extension model: concepts and applications in Africa

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Abstract

This paper describes the Agricultural Value Chain Extension Model after examining different extension models and differentiated terminologies related to evolution of extension models. Agricultural extension is a common denominator for functional value-chain and food security such that agricultural development outcomes are closely linked to agricultural advice provided by extension services. This model consists of five components of formal training, key clusters, informal training, value chain actors and value chain centre interlinked and connected with forward and backward linkages with overlapping activities among the key clusters. All of these interplay based on the level of funds and resources available for the activities connecting the components and the pervasiveness of the national agricultural policy where it is deployed. The paper concludes with the application of the Value-Chain Extension Model, by an International Non-Governmental Organization providing extension services along the value chain in Africa.

Key words: value-chain, extension model, system, approaches, Sasakawa Africa Association.

Introduction

Agricultural extension is a learning process whereby livelihoods of end-users are improved through information dissemination and advisory services that entail human interactions which extends beyond collection and sharing of research outcomes or local knowledge. It is often depicted as rural advisory services by Global Forum for Rural Advisory Services (GFRAS) (Sulaiman and Davis, 2012) and defined as “several activities through which information and services required by actors along the value-chain are provided for the development of technical, organizational, and management skills and practices towards the improvement of livelihoods and well-being”. This definition aligns with the concept of innovation systems and value -chain in that it proposes advisory services that support a range of actors and addresses wide-ranging problems.

Agricultural extension and advisory services delivery have been targeted towards significant contributions to decreasing poverty, inequalities, food insecurity, exploitation of natural resources, and non-participatory development such that it serves as commonality for measuring agricultural cum agribusiness development, functional value-chain, and food security. World Bank (2015) indicated that agricultural extension services have been a major stimulus for agricultural growth and poverty reduction by at least twenty-five percent than growth originating from other sectors. The varieties of extension policy and implementation plans across sub-Saharan African countries have high propensity for pluralistic services. Oladele (2011) noted that agricultural extension program is more likely to succeed if the conditions for growth in agriculture and related industries are in place through a legislated policy for service provision.

Objective of study

The main objective of this paper is to describe a new extension model and its application in the extension landscape in Africa. This paper introduces the agricultural value chain extension model after examining different extension models and differentiated terminologies related to evolution of extension models.

Materials and Methods

This paper applied the structured approach to qualitative modelling. Bredeweg et al. (2007) stated that the structured approach to qualitative modelling consists of “orientation and initial specification, system selection and

structural model, global behaviour, detailed system structure and behaviour, implementation and model documentation”. This paper examined the typologies of extension models, differentiation of terminologies, need for the value-chain extension model, theoretical underpinning of the model, and the application of the model.

Typologies of extension models

The Technology transfer model is usually linear and research or “supply driven,” efficiency-based, with specific focus on crop yield, reduction of production costs, for key food and cash crops as well as other agricultural commodities. The technology transfer model has been modified to include Agricultural Knowledge Information System (AKIS) and "Technology and Information Transfer Model (TITM) (Rolls et al. 1994). The T & V system was introduced to reform the extension services and remove the limitations of the conventional extension system through simplicity in organization, objective, and operations; and continuous adjustment to farmers’ need within the agricultural and administrative structure of any country of adoption (Benor and Baxter 1984). The participatory extension model promotes bottom-up as against top-down representations of the different components of an agricultural system. All value chain actors are promoted to be involved in the design and implementation of extension services. Prominent examples are animation rural and Farmer-back-to-farmer technology generation and transfer (Nagel, 1997). The Integrated Rural Development Model “fosters enabling the environment for broad-based and sustainable rural growth; enhancing agricultural productivity and competitiveness; fostering nonfarm economic growth; improving social well-being, managing & mitigating risks, reducing vulnerability; and enhancing the sustainability of natural resources management” (Yudelma, 1976). The Farming System Research and Extension (FSRE) model is a farmer-oriented and system- oriented, problem-solving approach that explores interdisciplinary activities by testing technologies in on-farm trials using Diagnostic Survey (DS), On-station Research (OSR), and On-farm research (OFAR) methodologies (Farrington and Martin 1987; Merrill-Sands, 1986).

Differentiation of extension system, strategy, methods, approach, and model

Oladele (2011) reported that agricultural extension and advisory landscape of sub-Saharan Africa is littered with several extension models which have implications for pluralistic extension tendencies. A maze of terminologies and confusion by several authors stress the need for distinct clarifications of

terminologies such as an extension system, strategy, methods, approach, and model. According to Anandajayasekeram et al. (2008), “an extension system depicts a set of components working together as parts of a mechanism or an interconnecting network, such as several interconnected components working together towards a particular goal of an organization such as ministry of agriculture; extension strategy is the plan of actions designed to achieve a long-term or overall aim often designed to operationally implement its policies; extension methods/ activities are techniques used by an extension system as its functions; an extension model is schematic description of a system or phenomenon that accounts for its known or inferred properties and an extension approach is the style of action within a system and embodies the philosophy of a system, which informs, stimulates, and guides different aspects of the system as its structure, its leadership, its program, its resources and its linkages”.

Table 1 clarifies the maze of terminologies (not exhaustively) created by the use of words interchangeably in extension discourse, using the definitions of Anandajayasekeram et al. (2008) and practitioners’ views to show clear distinctions between the extension system, strategy, methods, approach, and model.

Tab. 1: Differentiation of extension system, strategy, methods, approach and model

Extension systems	Extension strategies	Extension methods	Extension models	Extension approaches
Ministry of Agriculture	Household Food security	Individual extension methods	Transfer of Tech	Educational
Agricultural Development program	Commercialisation focus	Group extension methods	Commodity Ext	Communication
Agency for food security	Cash and export crop	Mass media extension methods	Training and Visits	Learning
Agency for agricultural development	Food safety, standards and regulations	Cyber-extension	Commodity Ext	Client-Based extension
Agency for Natural resource management	Market and agribusiness orientation	Video-based extension	Farming Systems	Client-Controlled Extension
Agency for cooperatives and Producers organisations	Entrepreneurship development	Farmer field school	Farmer participatory	General Clientele
Non- governmental organisations	Livelihood security	Community Based Agent	Value chain Extension	Selected clientele
International Non-Governmental Organisation	Natural Resource Management	Village agents		Private extension services
Agriculture Based / focussed Development Agencies		Volunteer farmers/agents		Technology driven
		ICT- based (Phone)		Need driven
		Model farmers		Pluralistic
		Lead farmers		Commercial services

Source: Author’s Conceptualization, 2019

The need for a value-chain extension model

The Value-Chain Extension Model (VECM) consists of five components of formal training and key clusters, informal training, value chain actor, and value chain centre interlinked and connected with forward and backward linkages with overlapping activities among the key clusters. All of these interplay based on the level of funds and resources available for the activities connecting the components and the pervasiveness of the national agricultural policy where it will be deployed. The Value Chain-Extension Model operates in a knowledge economy, where knowledge management is crucial and integral part of the chain for any product from any commodity.

Formal training - The formal training component of the VCEM consists of tailored curriculum to the needs identified for the value chain extension model, practice project, agribusiness practice centre, and assessment. These are to address the cognitive, affective, and psycho-motor domains of knowledge and skill acquisition. The formal training focuses on human capital development in an experiential manner that includes a lot of hands-on experiences through practice projects, based on real life problems, needs, involvement in operations, and application of agribusiness centre on any agricultural enterprise. It also covers the assessment of the acquisition of competencies needed for the application of skills acquired in formal training. Formal training can also be applied to value-chain actors and value-chain operators in a direct feedforward loop. The second section of the formal training is the main clusters which are covered by formal training on approaches and techniques of ensuring commercialization, market development, and linkages; production and productivity enhancement and agro-processing, postharvest management. The commercialization section leads in the key cluster due to the fact that the value chain starts and operates on the basis of market forces. Market is not the store nor the structures but the population of consumers who make demands on the products and services from the value chain to which extension services are required. The formal training covers the soft skills and technical skills required (GFRAS 2017). In each of the main clusters, the emphasis is on the application of extension approaches to convey technologies to end users who are value-chain actors.

Informal training - This component involves the transfer of skills, knowledge, and attitudes acquired from formal training to value chain actors through informal education techniques which are very notable with agricultural extension services. These informal training activities revolve round demonstrations, field visits, practice projects, village agents, e-extension and video extension. All informal training activities emanating from the main clusters can be implemented individually or collectively by each of the clusters.

Value chain actors - They are all categories of end-users associated with the value chain covering inputs, production, processing, marketing, and consumption. The demands and challenges of any categories of the value chain actors to effectively and efficiently implement the activities from the training received serve as feedback to the preceding components of the VCEM for realignment and adjustments.

Value chain centre- This component represents the culmination of the activities and implementation of training in a space or structure (although structure preferred as a visible and tangible output) where practical linkage and connection is seamlessly demonstrated in a perfectly consistent and coherent way. This will show viability, profitability, functionality, sustainability, and independence that lends to replicability and adaptability.

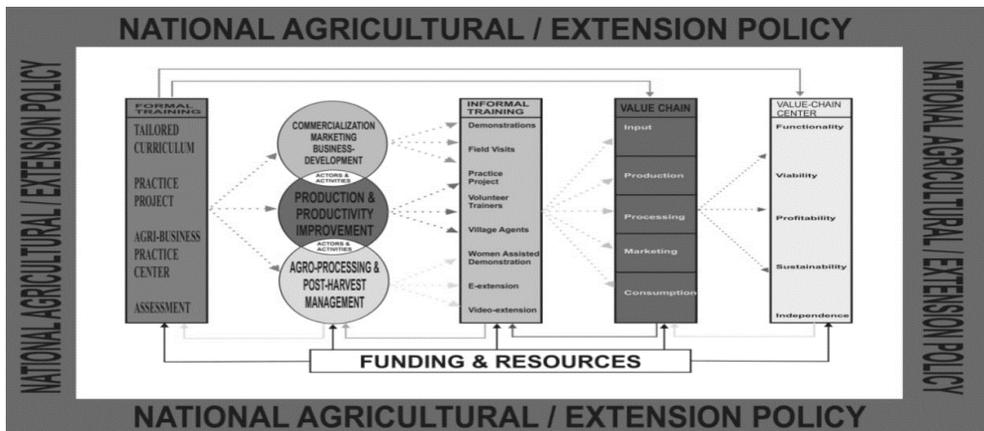


Fig. 1. Conceptualization of a Value Chain Extension Model
(Source: Author’s conceptualization 2019)

Comparison of Value Chain Extension with other models

This section compares the value chain extension model with other extension models based on the descriptions and delineation of concepts of the extension system, strategy, methods, approach, and model (Table 2). The value chain extension model combines and improves on the features and characteristics of the typologies of extension models.

Tab. 2. Comparative analysis of Value Chain Extension with other models based on model features

Models	Transfer of Tech	Commodity Ext	T and V	Commodity Ext	Farming Systems	Farmer participatory	Value chain Extension
Characteristics	Land grant university	Services provision by Private firms	Regular training of agents & farmers	Private coy provides services	Systems approach, inter-disciplinary	Centrality of farmer, participation by clientele	Regular training, Systems approach, collaboration Participation by all value chain actors
Strength	Strong link with research	Motivated agents, efficient services	More farmer contact, higher agent training	Motivated agents, efficient services	Reach small scale farmers, appropriate technologies	Capacity building, sustainability of programs	Strong link with research, capacity building, diversity of sources of funds, sustainability of programs
Weakness	Unidirectional flow of information	Limited focus	Unsuitable technology packages, unsustainable	Limited focus	High costs, initial non-recognition of women farmers	Heavy time & effort cost, difficult to evaluate	High level of coordination & breaking of silos required
Effectiveness	Diffusion of technology	Efficient extension	Professionalization	Efficient extension	Developing appropriate technologies	Long term development. Achieved	Effective & Efficient extension, dissemination of appropriate technologies, commercialization
Structure	Cooperative: federal, state, county	Vertical	Vertical; centralized	Vertical	Horizontal and vertical	Horizontal; decentralized	Horizontal and vertical
Funding	Cooperative	Commodity group or company	Donors and state	Commodity group or company	Donors , state	Donors, state, farmers, NGOs	Farmers, NGOs, State, Donors
Prog areas	Agriculture, home economics, community, youth	Commodity cash crop	Agricultural technology packages	Commodity cash crop	Farming systems; holistic	Farming systems; holistic	Value chain products from various commodities
Clientele	All citizens	Cash crop growers	Farmers especially 'contact farmers'	Cash crop growers	Focus on small scale producers	Emphasis on low resource farmers & gender	All value chain actors
Delivery Methods	Extension agents link research and farmers based on advisory committees	Top-down via EAs	Top-down via village EWs	Top-down via EAs	Recommendation domains	Farmer to farmer, village extension agents	Bottom-up, participatory and recommendation domain
Linkages & diversity	Strong links with university	Links with private research	Encourages links with research	Links with private research	Emphasis on inter-disciplinary approach	Emphasis on diverse	Links with public and private Research, University, with emphasis on multidisciplinary approach

Source: Adapted from Anandajayasekeram et al. (2008).

Theoretical framework and implications for the value-chain extension model

The theories underpinning the Value-chain extension model are discussed in this section.

The Lewinian Model of Action Research and Laboratory Training (Lewis, 1976) & Action Research (Lewin, 1946) introduced ‘action research’, ‘research in action’ and ‘cooperative research’ and emphasized clearly the difference that exist between an academic research objective and research and knowledge required for practice. The implications of the Lewinian Model of Action Research and Laboratory Training and Action Research are that any extension strategy or demonstration through which information is channelled to value-chain actors must focus on the development of human capital and competencies to show intervention and proof of intervention through the utilization of formal and informal training strategies in each section of the value chain. This will improve the learning for being and doing among the value chain actors for proper implementation of the model.

Dewey Model (Dewey, 1976) - The Dewey model expounds on “how learning transforms the impulses, feelings and desires of concrete experience into higher-order, purposeful action”. The model implies that proper details of how learning is converted into impulses, feelings, and desires of concrete experiences into higher-order for goal-oriented outcomes and actions should be revealed by the various segments of the value-chain extension model.

The Piaget's theory focuses on education through discovery learning that emphasizes active and practical learning through 'readiness' by sequencing of concepts and information in teaching, assimilation and accommodation because problem solving skills are best discovered than taught (Piaget, 1958). The implication of this theory as it relates to the value chain extension model is that problem-solving skills can only be properly learned and acquired by value chain actors based on their readiness to actively do, explore, and participate in the learning process. The formal training, key clusters, informal training, and value chain centre should facilitate the development and application of problem-solving skills of value chain actors through the use of several extension approaches.

The experiential learning theory propounded by Kolb points out the need for learners to be actively involved in a sequential four-stage learning cycle of concrete experience, reflective observation, abstract conceptualization and active experimentation for effective learning to take place (Kolb, 1984). The implication of the experiential learning model is that value chain actors are able to generate knowledge through the transformation of their experience as they become engaged in more practicums and involved in real-life situations. The application and use of extension approaches such as Supervised Enterprise

Projects, Enterprise centre and Agro-processing enterprise improve the competencies of value chain actors to replicate the model and also adapt it to different commodities.

The integrated learning theory focuses on ensuring effective learning through the connection of knowledge and skills from various sources, curricula, and experiences; skills application in various settings; utilizing point of views that are sometimes contradictory and diverse and ensuring contextual understanding of issues and positions (Bawden, 1995). The implication of the integrated learning strategies model is that proffering solution to a complex problem like the food systems involves system thinking by synthesising information across curricula, connecting knowledge and skills from various sources and experiences; applying skills and practices in various settings that might involve making use of diverse and sometimes contradictory viewpoints and contextually understanding various related positions and issues on the subject matter.

The Praxis model (Freira, 1985) is a combination of theory and practice with both being interrelated and complementary with both anchored on the maxim that states that “action without reflection is blind, reflection without action is impotent”. The implication of the model is that there is expected to be a seamless complement in theory and practice between all the technical and soft skills that will be utilized in value chain extension model. The knowledge and key cluster components of the value chain extension model should inform value chain actors on the modalities of the informal training and deployment of value chain centres.

The pedestal on which andragogy relies upon are that of self-concept, adult learner experience, readiness to learn, orientation to learn, and motivation to learn (Knowles, 1968, Kearsley, 2010). A reflection on the adult learning theory reveals that value chain actors are to be exposed to value chain extension model trainings that are problem-centred rather than content-oriented which have immediate impact and relevance to personal and professional life of the actors. Also, no form of competencies discrimination or segregation should be involved in the organization of trainings across value chain actors.

The System Theory Approach and Thinking states that “a system is a complex of interacting elements that are open to the environment, interact with environments; acquire qualitatively new properties through emergence, in a continual evolution; obtain feedback and self-regulating” (von Bertalanffy 1968). The line of thought and approach of the system theory implies that the training, activities and implementation strategies adopted for all value chain actors by the value chain extension model should integrate all the dimensions of the natural and social sciences. Formal and informal training that will provide adequate information and knowledge on the overlapping activities and actors in

the key cluster areas is required. Also, proper involvement of actors in the demonstration and practice that will facilitate an efficient connection as regards practical implementation must be put in place in the establishment of the value chain centre.

The Social exchange theory was developed by Homans (1961). Blau (1964) and Emerson (1962) stated that the formation of human relationships is brought about by the utilization of a subjective cost benefit analysis and comparing alternatives. The theory has “implications for Trust; quality of information, information sharing across networks; and interactions as found in group extension approaches such as Commodity Association Trainer (CATs) and Savings and loans associations (VSLA).” Trust ranging from trust to share and trust to interact influences the quality and usage of information being shared which in turn influences performance. This implies that interaction and sharing are two way (reciprocal). The theory ultimately establishes that the interdependence and strength of any partnership is facilitated by joint sharing of information and pooling risks together. Hilary et al., (2017) noted the application of social exchange theory for information quality, sharing and usage by farmer organizations on rice value chains in Bugiri and Luwero Districts, Uganda

Application of Agricultural Extension Value Chain Model

According to SAA (2018), Sasakawa Africa Association (SAA) is an international agricultural development NGO, established in 1986. It has been working on agricultural programs in 15 sub-Saharan countries, currently focusing on four countries (Ethiopia, Nigeria, Mali, and Uganda). However, the university component of Sasakawa Africa Fund for Extension education covers Malawi, Benin, Tanzania, Burkina Faso, and Ghana, in addition to the four focus countries in the area of human capital development. SAA works with national partners to improve the productivity and profitability of smallholder farmers by building their capacities along the entire agricultural value chain.

SAA (2018) stated that SAA thematic areas are Crop Productivity Enhancement (CPE), Postharvest Handling & Agro-Processing (PHAP) and Human Resource Development (Sasakawa Africa Fund for Extension Education (SAFE) with Business Development as cross cutting among other issues. SAFE was established in 1991 to provide in-country, demand-driven training programs. Mid-career extension agents are equipped with the necessary knowledge, skills, and competencies to effectively and efficiently disseminate crucial agricultural information and technology to farmers; which has mainstreaming value chain into curriculum of 26 universities in the training of mid-career extension personnel in 11 countries of Africa (SAA, 2020).

VALUE-CHAIN EXTENSION MODEL

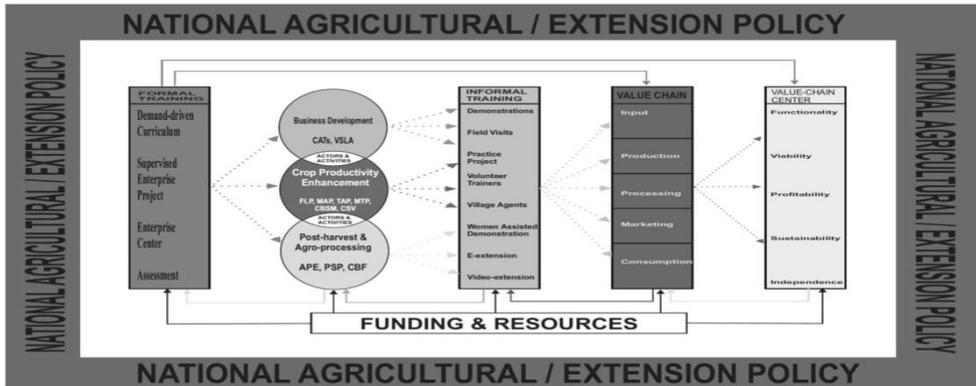


Fig. 2. Value-Chain Extension Model application by Sasakawa Africa Association (Source: Authors conceptualization 2019)

Conclusion

The Value Chain has been widely used to help understand and explain systems perspective of agriculture in terms of interconnectedness in relation to commercialization processes. There has been a number of researches which have been used to analyse, develop, and describe the value chain for different products from either the same or different commodities. However, extension services to promote the functionality of the value chain process have been segregated in an exclusive manner of operations that have led to the dysfunctionality of the commercialization processes in what should be a continuous, functioning, and viable chain to overcome extension services supporting production, processing, marketing, and other activities in agricultural enterprises in a mutually exhaustive and exclusive patterns. This paper has formulated the Value-chain extension model, described its components, compared it with other extension models and illustrated the application of the model by an International Non-Governmental Organisation providing extension services along the value chain in Africa.

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Савјетодавни модел пољопривредног ланца вриједности: концепти и примјена у Африци

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Сажетак

Овај рад описује савјетодавни модел пољопривредног ланца вриједности након представљања различитих савјетодавних модела и диференциране терминологије веза за развој савјетодавних модела. Пољопривредна савјетодавна служба је општи назив за функционални ланац вриједности и безбједност хране у којем су исходи пољопривредног развоја уско везани за пољопривредне савјете које пружа савјетодавна служба. Овај модел се састоји од пет компоненти формалне обуке, кључних кластера, неформалне обуке, учесника у ланцу вриједности и центра ланца вриједности који су међусобно повезани са претходним и наредним повезницама активностима које се преклапају у оквиру кључних кластера. Све се ово прожима на основу нивоа средстава и ресурса који су на располагању за активности којима се повезују компоненте и присутности националне пољопривредне политике тамо гдје се она примјењује. Закључак рада доноси примјену Савјетодавног модела ланца вриједности од стране међународне невладине организације која пружа савјетодавне услуге путем ланца вриједности у Африци.

Кључне ријечи: ланац вриједности, савјетодавни модел, систем, приступи, Удружење Сасакава Африка.

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