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Impact of Innovation Platforms on Marketing Relationships:  
The Case of Volta Basin Integrated Crop-Livestock Value Chains  
in Northern Ghana

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## Abstract

A recent trend in scientific and agricultural development approaches show a shift from linear transfer of technology models towards system thinking to improve livelihoods resilience of smallholder agriculturalists in developing countries, and thus to achieve sustainable food security. One manifestation of such shifts is the recognition of agricultural innovations as multi-dimensional and co-evolutionary processes which integrates technological, organizational, socio-economic and institutional innovations that can create synergies when applied jointly. This thesis attempts to test a new conceptual framework for evaluating innovation platforms (IPs) for agri-food value chains. The framework is based on the structure-conduct-performance hypothesis of industrial organization in combination with concepts from new institutional economics and marketing. Data to test the framework was collected through interviews of stakeholders of two IPs in the Volta Basin Development Challenge Program on integrated management of rainwater in crop-livestock agro-ecosystems in two northern regions of Ghana. The study used a mixed methods research methodology. A semi-logarithmic multiple regression analysis was employed to test relationships between the variables representing the structure, conduct and performance of the platforms following a principal components factor analysis to obtain reduced number of underlying factors from Likert-type statements on communication and information sharing (representing the conduct element) and improved market access (for performance). The qualitative information obtained through focus group discussions, interviews of platform facilitators and key respondents, and participant observation of an IP meeting also validates a possible link between the structure of the platforms, the conducts of their members, and the resulting market performance through reducing transaction costs of search and information. The econometric results also support this claim. Improvement in interaction or communication within IP, gender, the location of the IP, and household wealth were found to have a significant effect on members' access to market. Due to the short life of the project and the small number of people involved in the IPs, it is difficult to come to a strong conclusion on whether the framework is most appropriate for conducting an impact evaluation, or if at all, the results so far achieved are significantly associated to the intervention. This suggests the need for further work to refine and test the framework extensively through impact evaluation of completed projects or projects with relatively longer life; and also assess the overall impact of the IPs including environmental, social, and project sustainability. However, given the theoretical support from well-founded theories, the new framework could be used side by side with conventional methods of project evaluation to support existing approaches by producing complementary or supplementary results and help judge its suitability.

*Key words:* Innovation platform, Volta2, Ghana, SCP framework, communication, market access

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## Acronyms

CGIAR	Consultative Group on International Agricultural Research
CPWF	Challenge Program on Water and Food
CSIR-ARI	Council for Scientific and Industrial Research-Animal Research Institute
DFBA	Dairy Farmers Business Association
DFID	Department for International Development
EADD	East Africa Dairy Development
EC	European Commission
FARA	Forum for Agricultural Research in Africa
FIPS	Farm Inputs Promotions
FONG	Farmers Organization Network of Ghana
IFAD	International Fund for Agricultural Development
ILRI	International Livestock Research Institute
IMRD	International Master of Science in Rural Development
INERA	Institut de l'environnement et de Recherche Agricoles (Agricultural and Environmental Research Institute)
IP	Innovation Platform
IWMI	International Water Management Institute
KMO	Kaiser-Meyer-Olkin
MoFA	Ministry of Food and Agriculture
NGOs	Non-Governmental Organizations
OLS	Ordinary Least Squares
PAR	Participatory Action Research
RESET	Regression Equation Specification Error Test
SARI	Savannah Agricultural Research Institute
SCP	Structure-Conduct-Performance
SDC	Swiss Agency for Development and Cooperation
SNV	Netherlands Development Organization
SSA	Sub-Saharan Africa
UK	United Kingdom
VBA	Village-Based Advisors
VBDC	Volta Basin Development Challenge
VIF	Variance Inflation Factor
WUR-PPS	Wageningen University and Research Center-Plant Production System

## 1. Introduction

### 1.1 Background

The shift in scientific thinking and development efforts from a linear technology development towards integrated and concerted strategies to improve the livelihoods of smallholder agriculturalists in developing countries, and thus to achieve food security at large, has been a recent phenomenon (*Nederlof et al. 2011:55; ILRI 2012; Adekunle and Fatunbi 2012; Nyikahadzoi et al. 2012*). One manifestation of such shift is the recognition of agricultural innovations as multi-dimensional and co-evolutionary processes which require not only technological innovations, but also organizational, institutional and socio-economic transformations that can create synergies when applied jointly (*Huis et al. 2007; Nederlof et al. 2011:14; Kilelu et al. 2013*). The emergence of new theories and propositions in modern economics has challenged many of the conventional wisdoms of traditional economics and new frameworks for understanding real life markets are evolving. Theories of new institutional economics and transaction costs economics, for example, have successfully challenged the perfect rationality, zero transaction cost and other restrictive assumptions of traditional economics and argued for the importance of recognizing frictions in real life markets which define relationships and determine market outcomes (*Williamson 1991; Furubotn and Richter 2010*). The need for such multi-dimensional and concerted approaches to development and the need for analyzing the real workings of markets have thus been getting substantial recognition in recent years.

In this regard, the innovation systems approach is replacing and widely applied as a promising alternative to both conventional development interventions and purely technological innovations in many fields of agricultural systems and is believed to contribute to sustainability (*Nyikahadzoi et al. 2012*). The new approach has been experimented through the establishment of several innovation platforms (IPs) particularly in the developing world. Given the vast amount of literature and case study reports on IP projects (see for example various reports in *Nederlof et al. 2011; Adekunle et al. 2012; Gildemacher and Mur 2012*), Sub-Saharan Africa (SSA) appears to be the leading region in terms of attracting attention in this regard, indisputably due to the high level of underdevelopment and prevailing poverty and the growing interests and involvements of various national and international development agencies working on poverty reduction in the region. IPs are in fact becoming both development agencies' new intervention tools as well as researchers' spaces for experimentation with this new approach for 'sustainable'

development. Nederlof and her colleagues have reviewed twelve practical experiences of IPs from SSA to highlight the importance and wider applicability of the concept, and also draw better understanding of the conditions under which different actors, with not necessarily overlapping interests, could work together in such multi-stakeholder setting (see *Nederlof et al. 2011*). Besides these, there are several case studies and reports on the overall impacts of IPs in SSA (see also *Adekunle et al. 2012; Gildemacher and Mur 2012; Kilelu et al. 2013*).

Thus, there is a new wave of research focusing on IPs and accepting the multi-stakeholder structure as collective actions' framework for developing a new agricultural development policy model with a promising potential for solving food security problems in developing countries (*Nyikahadzoi et al. 2012*). Some of such studies have been applied to value chains development in agriculture although IP approaches have been widely used in many other aspects of rural development including natural resource management (*Devaux et al. 2009; Markelova et al. 2009; Mcnamara 2009; Han et al. 2011; Kilelu et al. 2013*).

One of the focuses of contemporary research is on the relationships between the structural formations and resulting modes of conduct or interrelationships among the main actors which in turn could determine the performances of the platforms or its members in achieving certain development objectives (see for example, *Daane 2010; Kilelu et al. 2013*). When applied to value chains development, the use of combination of concepts of the "structure-conduct-performance relationship" used in industrial organization; and the role of governance structure in place, institutional arrangements and transaction costs known in new institutional economics as well as the idea of "marketing relationships" from the marketing literature can be synthesized. This can give a better understanding of the impact of IPs (*Cadilhon<sup>1</sup> 2013*).

This study attempts to synthesize and apply these concepts to IPs established in 2011 in northern Ghana. The platforms have been initiated as part of the Volta2 sub-project of the Volta Basin Development Challenge (VBDC) under the CGIAR's Challenge Program on Water and Food (CPWF). The VBDC project has the general aim of solving the development challenges of integrated crop-livestock agro-ecosystems in the Volta basin in Burkina Faso and northern Ghana through improved use of rainwater and small

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<sup>1</sup> *This is a new conceptual framework under construction to be used for monitoring and evaluation of IP projects on agri-food value chains and is prepared for the forth-coming 138<sup>th</sup> EAAE Seminar on Pro-poor Innovations in Food Supply Chains, Ghent, Belgium, September 11-3, 2013.*

reservoirs. The Volta2 project has the main goals of increasing crop, livestock as well as water productivity and improving the capacity of various actors through IPs, and hence contributing to poverty reduction and improvement of livelihoods' resilience. The second aim of the project i.e., building capacity of actors through IPs had three specific objectives: identifying how multi-stakeholders can better work together to support value chains; identifying opportunities, constraints, and strategies to address and promote value chains; and identifying steps and modalities to ensure dynamic and responsive IPs (*CPWF 2010; SNV-Ghana 2011*). Since its inception, the Ghana wing of the project has established two IPs through the collaboration of various stakeholders including crop-livestock value chain actors (mainly producers, traders and processors) and other stakeholders (see section 4).

In the context of the Volta2 project, IPs are operationalized as “*coalitions of actors along value chains formed to address constraints and explore opportunities to upgrade the value chains through the use of knowledge and mutual learning*” (*CPWF 2010*). The platforms were established to provide mechanisms of facilitating communication and collaboration among multiple actors with different interests to help address challenges and identify opportunities for common benefits in order to facilitate value chains development as well as to serve as spaces for participatory action research (*CPWF 2010; CSIR-ARI 2013*). A project establishment report indicates that the platform members and supportive stakeholders have recognized the existence of poor linkages between different levels of value chain actors and a need for strategies to develop social infrastructure for better interaction through information sharing, communication and cooperation (*SNV-Ghana 2011; SNV 2011*). A lack of improved seeds and other inputs, lack of functioning markets for selling the produce during harvest, transport problems, low prices for livestock during rainy season, farmers' lack of information and capacity to negotiate for good prices, and traditional beliefs regarding ownership of resources by women have been identified as the major challenges. Thus, some of the recommendations were to link farmers to processors, school feeding programs, national buffer stocks and other trading companies to ensure ready and well-functioning markets in order to utilize the opportunities of existing but uncoordinated markets. The role of development agencies in improving dissemination of market related information has also been taken as one mechanism for improving access to market. Improved communication and interaction could reduce information asymmetries regarding market prices; improve information about trading partners, reduce transaction costs, improve bargaining power, etc., (*Alemu*

*et al. 2012*) and hence determine participants' market outcomes and the capacity to claim a fair share of the value for the product or service.

The study attempts to assess the impact of IPs on marketing relationships among its value chain actors and to test a new conceptual framework. Through identifying the achievements and challenges of the IPs the study attempts to assess the role of improved communication and information sharing within such collectives in improving actors' market access.

## 1.2 Problem statement

As also highlighted in the background, a recent trend in the scientific and agricultural development approaches shows a shift from a linear transfer of technology model towards a system thinking which incorporates technological, organizational, socio-economic and institutional innovations (*Huis et al. 2007; Mapila et al. 2011; Adekunle and Fatunbi 2012*). *Huis et al. (2007)* narrated this growing trend of multi-disciplinary approaches to enhance agricultural innovation as the “*convergence of agricultural sciences to support innovations*”. Although the term ‘*innovation*’ in the phrase “*innovation platform*” may not strictly refer to technological innovations, the IP approach to development, which requires the convergence of different sciences, by itself, can be considered as an innovation from a social science perspective simply because it is a new way of tackling poverty (*Huis et al. 2007*). Since innovations are considered context specific and could involve reordering of relationships and interactions between stakeholders (*Huis et al. 2007*), the institutional and organizational elements of this systems approach, are gaining increased attention (*Daane 2010; Amankwah et al. 2012*). In this sense, the argument is that continued interactions of different but converging opinions and experiences (and even negotiated outcomes of diverging opinions) of heterogeneous stakeholders and joint learning could result in better ideas that would have not been developed or acquired autonomously by most of the members. Thus, IPs can serve as spaces or forums for such kinds of interactions and create synergies.

In line with such theoretical justifications of the potential benefits of such multi-stakeholder associations, a significant share of development effort and research in agriculture is shifting from the ‘business as usual’ practices to experimenting new market relationships or collaboration approaches which are implemented through the participation of various stakeholders. It is also against such arguments that several IPs

have been established and operating in many parts of the developing world through the collaboration of NGOs, governmental organizations, agricultural value chain actors, research institutes, etc. IPs particularly organized around value chain development are gaining significant attention. Most value chain platforms are aimed mainly at promoting and improving information flows along value chains to improve the workings of markets. New knowledge can be generated through interactions and information sharing among diverse actors. Thus, the very reason of using such approach is that they are able to enhance interactions to forge better linkages between these diverse stakeholders (*Nederlof et al. 2011:56*). Such linkages could also result in new ideas and opportunities for agricultural innovation and development (*Nederlof et al. 2011:14*).

Studies show that depending on the way value chains are organized, information and communication plays central role in determining the market outcomes (*Mcnamara 2009; Nyikahadzo et al. 2012; Qing-jing et al. 2012*). *Devaux et al. (2009)* argued that a participatory market chain approach and stakeholder platform with intensive communication between and within groups of producers, market agents and agricultural service providers creates new market niches through commercial, technological and institutional innovations. Existence of common interests, sharing of knowledge and market information, and developing new business opportunities have been mentioned as the main reasons for improved access to markets. *Markelova et al. (2008)* have also demonstrated how collective action institutions can serve to improve market access especially for the rural poor by addressing inefficiencies, coordination problems and market barriers. This shows that the mechanisms and strategies through which collective organizations communicate and share market information depend on how they are established. This then determines the level of access to markets for the members of the collectives.

Improving market access is one of the intervention strategies to help improve food security and contribute to sustainable development in the two Ghanaian districts in which the Volta2 project intervenes through IPs. However, formal assessments of the structure of the platforms, the process of interaction among the stakeholders, and the results achieved have not been formally conducted yet. In particular, to what extent the level of market oriented interactions among these actors and the efforts made on improving communication and exchange of price information and other market related aspects through the IPs have resulted in significant improvement in access to market, needs to be

investigated. Previous studies on projects of similar nature are based on either quantitative approaches such as cost-benefit analysis (see reports in *Gildemacher Mur 2012*) or qualitative analysis (*Nederlof et al. 2011; CORAF/WECARD 2012; Kilelu et al. 2013*) based on field experiences and discussions with stakeholders on the success stories in conjunction with simple descriptives (*Devaux et al. 2007; Devaux et al. 2009*) in order to explain impact pathways of such platforms. Although qualitative and descriptive methods are crucial to explore the impacts of IPs, the significance of such impacts could be better validated if a complementary econometric analysis could have been used. To the best of my knowledge, there is no study that employed econometric approach to assess the impact of IPs.

This study, therefore, attempts to use a mix of methods to assess the structure of the IPs and interactions between various actors in general and to investigate the impact of improved communication and information sharing on market access in particular. It uses an in-depth qualitative analysis supported by econometric approaches to test the significance of the impacts of the two IPs on marketing relationships between value chain actors. In addition, a new and potentially vital framework for monitoring and evaluation of agri-food value chains development IP projects is tested.

### 1.3 Objectives

The main objective of the study is to understand the structure and interrelationships among market actors and to examine the impact of improved communication and information sharing on market access in the Volta2 integrated crop-livestock agro-ecosystems value chain IPs in Tolon-Kumbungu and Lawra districts of northern Ghana.

This broad objective is explored through the following specific objectives:

- ❖ to examine the structures of the two IPs and their impact on market access
- ❖ to assess the interrelationships between various actors within the platforms
- ❖ to investigate the impact of communication and information sharing on performance of the value chain actors in terms of improving market access
- ❖ to document additional evidence regarding the impact of IPs on marketing relationships

#### 1.4 Scope of the study

The aim of this study is confined to understanding and analyzing the impact of IPs on marketing relationships between actors in the integrated crop-livestock value chains of the Volta basin in northern Ghana. It particularly seeks to examine the kind of interactions between the value chain actors and to investigate the relationships between communication and information sharing and changes in market access. The results are therefore based on a cross-sectional data from the Volta2 IP members in northern Ghana.

#### 1.5 Significance of the study

As one of a few attempts to incorporate concepts, theories and methods from various disciplines the study contributes to documenting empirical evidences on the role of IPs on marketing relationships in value chains development and the use of such approaches as alternative to linear technological innovation and conventional development interventions. The study also is relevant for testing the suitability of the multi-disciplinary framework for evaluating the impacts forums such as IPs have on marketing relationships in an integrated crop-livestock value chains setting. Specifically, it contributes to the general framework being built at ILRI to be used for monitoring and evaluation of the impacts of IPs. The result of the study is, therefore, expected to benefit various potential users: students, researchers and any interested individual who may be planning to advance study on IPs; and development organizations that plan to engineer similar interventions. More importantly, the results would be useful for organizers of the IPs and its other institutional stakeholders to evaluate the processes and take necessary corrective measures in order to fully achieve the objectives of the project in a sustainable way.

#### 1.6 Organization of the thesis

The rest of the thesis is organized as follows. Section 2 introduces and elaborates the proposed conceptual framework and gives some theoretical background. The third section reviews existing literature. The fourth section gives a brief background about the Volta2 project and explains the geographic as well as socio-economic contexts of the study area. The details of the methods and materials for the study are discussed in the fifth section. Section 6 presents the results and discussion while the seventh section provides summary, conclusion and recommendations.

## 2. Conceptual Framework and Theoretical Background

### 2.1 Introduction

The study employs a combination of methods from new institutional economics and industrial organization theory and concepts from the marketing literature to examine the impact of communications and information sharing in IPs in improving market access for the actors constituting the platforms, particularly the value chain actors. This mainly adapts the usual SCP framework in order to examine whether and how the structures of the platforms influence the conduct of its members; and how the conduct in turn influences the performance of the value chain actors, which in turn may shape the structure creating a feedback loop in the framework. The following sub-sections elaborate on the basics of IPs and the new conceptual framework with its components.

### 2.2 The SCP paradigm

The structure-conduct-performance hypothesis, also known as the SCP paradigm was developed in industrial organization and widely used to analyze the relationships between the structure of the market in which firms operate, the behavior or conduct of the actors within the market and the performance of the entire industry. The concept was introduced following the works of Edward Mason and Joe Bain at Harvard in the 1940s and 1950s and has since attracted the attention of several proponents and opponents of the relationships between the three elements (*Grigороva et al. 2008*). According to this paradigm, there is a priori linear relationship between the three concepts of industrial economics i.e., market structure, market conduct and market performance. The main hypothesis of the SCP framework is that the overall performance of a given industry is influenced by the conduct or behavior of the firms or market players within the industry, which in turn is determined by the structure of the market, or industry (*Grigороva et al. 2008*).

To indicate the dynamics of this framework, economists have elaborated on the three elements. In a purely industrial organization's language, the structure of an industry can be explained by the existence of barriers to entry and exit, the number of competitors, vertical integration and the extent of product heterogeneity. In the original version of the hypothesis, structure was assumed to be exogenously determined (*Grigороva et al. 2008*). Conduct, on the other hand, has strategic features and relates to the pricing and output decision behaviors (competitive or collusive), legal tactics of firms, investment and

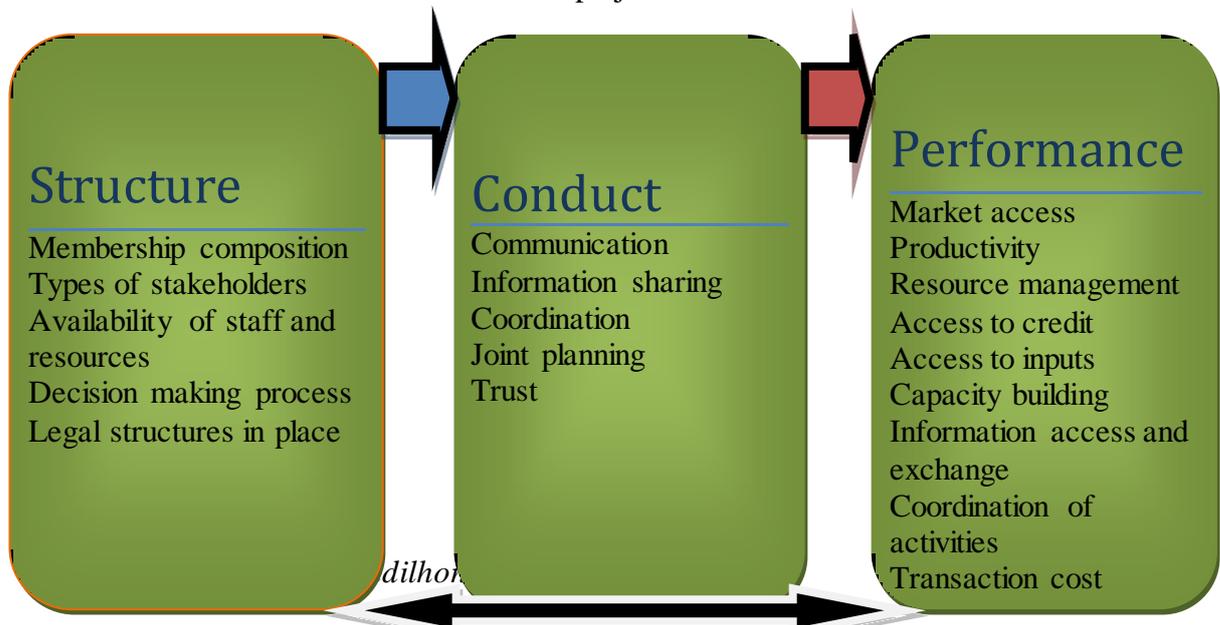
product choice resulting from the size and relative differences of market powers of the participants and hence conduct depends on the structure. This refers to the entire strategy by firms of reacting to market circumstances and certain opportunities in pursuit of desired goals. The overall performance of the industry could then depend both on the elements of conduct and structure. Performance is explained by the outcome or success of the market in terms of several attributes such as efficiency, profitability and resulting market power (*Leendertse 2004; Edwards et al. 2006*). This explanation in fact does not take into account the regulatory role played by governments in influencing markets using several policy instruments such as subsidies, regulations, price controls and altering trade rules. It can also be assumed that governments usually act as correctives when the market performance is considered as undesirable to the society.

There are counter arguments and empirical justifications against the original a priori linear relationships between the three elements. The original hypothesis was based on the belief that performance or success of an industry depends critically on the conduct (competitive behavior of firms in terms of determining price and output levels) which in turn hinges upon the kind of market structure in place. Opponents of the hypothesis argued that this link could also be non-linear and may involve feedback effects (*Leendertse 2004*). As empirically confirmed in various studies, performance may determine the structure of the industry and hence the causation could be difficult to ascertain.

In the context of this study, indicators of the elements of the SCP framework have been identified based on both the literature and the development objectives that stakeholders set out during the establishment of the platforms (see *Figure 1*). Membership composition, decision-making processes, source of funding, staff availability, existence of legal and regulatory frameworks and types of stakeholders represent the variables for the structure of the IPs. Conduct is represented by more strategic variables such as information sharing, communication, joint planning, coordination and trust whereas performance variables are directly derived from the stated developmental goals of the project by its members. Performance variables include access to inputs, access to credit, crop and livestock production, soil and water management, market access, information access and exchange, capacity building among value chain actors, coordination of activities among value chain actors and levels of transaction costs (*Cadilhon 2013*).

These sets of variables representing the three elements could theoretically be used to make a detailed analysis of the IPs and hence test the SCP hypothesis in a local development oriented multi-actor value chains setting. Given its role in poverty reduction and livelihoods improvement for the rural poor, as acknowledged by several studies (see for example *Kydd and Dorward 2004; Almond and Hainsworth 2005; Devaux et al. 2007*), market access and the determinants of its success (or failure) got a central focus in studies of rural development. A number of studies (see for example *Mcnamara 2009; Nyikahadzoi et al. 2012; Qing-jing et al. 2012*) have also indicated that depending on the way value chains are organized, information and communication plays vital roles in determining the market outcomes. This study, thus, focuses on analyzing the relationships between “communication” and “information sharing”, as conduct indicators and “improved market access”, as performance indicator. Thus, the main hypothesis to be tested is what aspects of (and to what extent) communication and information sharing have contributed to changes in market access for value chain actors in the IPs.

Figure 1: Graphical representation of the SCP framework and the possible links among its elements in the context of an IP project



### 2.3 The New Institutional Economics of Markets

Frustrations with the failures of Neoclassical optimization models in explaining the workings of real life markets have led many economists to desperately look for new approaches to better describe real economies and behaviors of actors (*Demsetz 1969; Williamson 1991*). The works of several institutional economists in general and those of Coase and Williamson in particular have gradually shifted the central focus in economic enquiry from economic optimization to the need for understanding specific transactions in

order to minimize transaction costs and choose the best form of governance structure for a given transaction (*Coase 1937; Williamson 1991*). New institutional economics has therefore taken the lead in guiding institutional economists in this new direction of research. One of the main specificities of the new institutional economics of markets is the consideration of transaction as the unit of analysis (*Williamson 1991*) as opposed to the excessive focus on prices, individuals and welfare changes in neoclassical economics models. Therefore, understanding each specific transaction and measuring or at least explaining the associated costs of transaction have become the focus.

Proponents of this evolving school recognized the existence of positive transaction costs (refer *section 2.3.1*) and substantial information asymmetry between transacting partners which results in bounded rationality. Bounded rationality thus creates a room for opportunistic behavior and affects the distribution of gain or welfare from the transactions (*Williamson 1971*). Opportunism, which is akin to cheating, is the act of taking advantage by those having better information of the situation when some actors are boundedly rational i.e., may have the intention to be rational but unable to access information or lack the capacity to process and use available information, and hence fail to make the alleged optimal decisions. The existence of high transaction costs could also make some actors to be satisfied with what they have and can do. These arguments challenge the neoclassical optimization models and hence understanding the nature and attributes of specific transactions, the associated costs of making transactions and the choice of different governance structure to organize transactions became important.

### 2.3.1 Transaction costs

Generally, economists explained transaction costs as the costs not directly associated with the actual transaction but the hurdles involved in making transactions. Recognizing such costs and designing mechanisms to reduce them are considered in new institutional economics as important parts of the work in policy choice and policy design as this would affect the efficiency and sustainability of the policies (*McCann et al. 2005*). There are several explanations of transaction cost in the literature but a formal and clear cut definition does not seem to exist. *Eggertsson (2003)* for example defined transaction costs as “*the costs that arise when individuals exchange ownership rights to economic assets and enforce their exclusive right*” (*Eggertsson 2003:14*). *Coase (1937)* on the other hand defined transaction cost as “*the cost of using the price system*”.

Mainly based on the explanations of *Williamson (1991)* and the detailed examination by *Furubotn and Richter (2010)*, market transaction costs may be operationalized as the costs associated with the activities at successive stages of a given transaction (each of which involving positive transaction cost). These are the costs of preparing contracts (search and information costs), concluding contracts (costs of bargaining, negotiation and decision-making) and monitoring and enforcing of agreed upon contracts (which also include adjustment costs).

### 2.3.2 Governance structures and institutional arrangements

The type of governance structures in place and institutional arrangements are among the main determinants of transaction costs that can influence the outcomes or performances of markets (*Williamson, 1999*). *Lin (1989)* defined institutional arrangement as “*the formal or informal set of behavioral rules that govern specific pattern of action and specific regulations*” (*Lin 1989:7*). *Furubotn and Richter* on the other hand defined institutional arrangement as “*the system of rules that determine the property rights configuration existing in an economy and the instruments to enforce the rules*” (*Furubotn and Richter 2003:5*). Based on the specific set of rules and regulations in place, economists have identified three generic forms of governance structures (which *Williamson* called ‘*forms of economic organizations*’). These are spot markets, hierarchies or firms and hybrids, all of which differ in the level of transaction costs (*Williamson 1991; Williamson 2002*).

Hierarchy, also termed as firm or vertical integration, refers to the governance form that is characterized by low incentive intensity, low degree of flexibility of participants, high dependence of actors in making choices and high degree of administrative control in general (*Williamson 1971; Powell 1990; Williamson 2002*). Because interests could be harmonized when actors are vertically integrated or form a unified form of governance structure there will generally be less room for opportunistic behavior (*Williamson 1971; Powell 1990*).

Spot market or simply market on the other hand specializes in the exchange of property rights through mechanisms, which require mutual consent of transacting parties. In market governance structure, the price system or market coordinates decentralized decisions of agents using information available through the price system (*Williamson 1991*). This requires institutional supports from a third party, such as the state, with supreme authority, to exist and function properly (*Furubotn and Richter 2010*). In

transactions organized as spot markets, there is high incentive intensity, high degree of flexibility, low administrative control (participants enjoy significant autonomy) and less mutual dependence (*Williamson 1971; Powell 1990; Williamson 2002*).

The third type of governance structure is hybrid, whose attributes fall in between those of a price system and a hierarchy. Such forms bring autonomous actors with common interest to operate through mutual adjustment within similar business entities and through little help from either the pricing system or resources of common ownership. In addition to its intermediate levels of incentives, administrative control and its high interdependence of actors a hybrid structure follows a semi-legalistic contract law (*Williamson 1991*). Examples include sub-contracting, cooperatives, networks, franchising, partnerships, strategic alliances, etc. Given the nature of interactions between the value chain actors, the level of autonomy its members enjoy, the legal frameworks governing the multi-actor group, etc., this study considers IPs as hybrid structures, regardless of whether they are used in governance of actual market transactions or as forums for better interactions.

### 2.3.3 Transaction attributes

The literature on institutional economics suggests three main attributes of transactions that need to be examined in order to make the best choice of a governance structure for a given transaction. It has been explained by Williamson's "discriminating alignment hypothesis" that there is no best form of governance that fits all transactions. The hypothesis states that "*transactions which differ in their attributes, are aligned with governance structures, which differ in their cost and competence, so as to effect a transaction cost economizing result*" (*Williamson 1991*). Therefore, the optimal choice of governance form depends rather systematically on the types of transactions and associated attributes of those transactions. These attributes include; the type and degree of asset specificity (or transaction-specific investment), the uncertainty to which transactions are subjected to and the frequency with which transactions recur. These attributes have been widely used to analyze the trade-offs between the different governance structures although some writers contend the relevance of the discrete classification of the three forms of governance (see *Powell 1990*).

Asset specificity refers to "*the degree to which an asset can be redeployed to alternative uses and by alternative users without sacrifice of productive value*" (*Williamson 1991*).

For Williamson (1991), there are six different types of asset specificities namely: site specificity; physical asset specificity; human-asset specificity (that arises in learning by doing); brand name capital; dedicated assets (discrete investments) and temporal specificity (technological non-separability). Investments or transactions that involve a certain level of specificity determine the level of mutual dependence between transacting partners and shape the type of contractual relationships they would chose to have (Lin 1989).

On the other hand, existence of any form of uncertainty or human beings' inability to perfectly predict future eventualities plays a role in the choice of institutional arrangements (Williamson 1991). Uncertainty can arise either from the unpredictability of the future state of the economy or nature or from intentional or unintentional behaviors of transacting partners.

Frequency of transactions is another factor that influences why actors choose a specific governance form. Frequency simply tells the number of times a given actor engages in a particular transaction or with a particular actor. Those who trade very occasionally may prefer to choose spot markets and act autonomously while those who make professional and frequent transactions choose to have close relationships with their partners (Furubotn and Richter 2010). Therefore, forming strong linkages and relationships such as vertical integration may become the best option if there is high asset specificity, high uncertainty and if the frequency of transaction is also high.

## 2.4 Innovation platforms

### 2.4.1 Definitions and basic concepts

The concept of IPs has evolved and several definitions have flourished since 2004 when it was first introduced<sup>2</sup> as an alternative approach to integrate technological innovation with development intervention. In line with aggressive use of the approach for development interventions and research in recent years, a number of definitions have flourished to characterize and operationalize the meaning of IPs within the domains and objectives of several organizations. An IP may be defined as a “*physical or virtual forum established to facilitate interactions, and learning among stakeholders selected from a community chain leading to participatory diagnosis of problems; joint exploration of opportunities and*

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<sup>2</sup> The concept was introduced by FARA (Forum for Agricultural Research in Africa). FARA applied an IP approach in 2004 with the objective to improve agricultural research in developing countries (Adekunle et al. 2012:10).

*investigation of solutions leading to the promotion of agricultural innovation along the targeted commodity chain” (Adekunle et al. 2010:2).* This definition is mainly used by the Forum for Agricultural Research in Africa (FARA). IPs are understood in this sense as multi-stakeholder forums through which interaction and information exchange are facilitated to find participatory solutions to development challenges.

The International Livestock Research Institute (ILRI) has operationalized IPs as “*equitable, dynamic spaces designed to bring heterogeneous actors together to exchange knowledge and take action to solve a common problem” (ILRI 2012; Cadilhon 2013).* Kilelu et al. (2013) also defined IP as a “*multi-actor configuration deliberately set up to facilitate and undertake various activities around identified agricultural innovation challenges and opportunities at different levels in agricultural systems”*. Although the aims for which IPs are established according to these definitions jointly seem to solve development problems of common interests, the definition used by FARA gives a more extended scope.

These definitions do not explicitly refer to the levels at which IPs are or should be formed to address the common issues of the stakeholders. Despite the fact that many agricultural innovations take place at grassroots or operational levels, IPs can also be formed at the highest or strategic administrative level because localized operational governance structures could be determined by strategic development objectives. Those platforms established at the operational levels are usually involved with the actual operations listed in the definitions above; whereas those established at the strategic levels are focused on designing development policies and domains and facilitate the operations or executions of activities for the lower level platforms (Adekunle et al. 2010). Operational level platforms are more involved in practical actions to improve the existing socio-economic situations of actors by facilitating joint experimentation and enhance the link between farmers and relevant stakeholders in development (Nederlof et al. 2011:20; Nyikahadzoi et al. 2012).

The various definitions mentioned above and the practical cases presented in the literature review highlight that IPs are of various types, can be formed at various levels and may be initiated by several groups of stakeholders to fulfill different objectives. In either case, they are considered as open forums for better interaction between its members. One of the specificities of IPs, at least theoretically, is this fact that they are voluntary associations whose members come together to tackle a problem of common interest through information sharing and continuous interactions. In this sense, there is growing consensus

that such associations can serve as alternatives to the conventional development interventions. The fact that they are voluntary networks to solve local problems within their own sphere of shared knowledge also makes them good examples of endogenous development efforts, which could foster sustainability (*Water-Bayers and Bayer 2009*).

Figure 2: A simple representation of an innovation platform and its components



*Source: PAEPARD: conference on learning and innovation platforms for sharing and disseminating knowledge and technologies in Africa, October 2012*

As indicated in *Figure 2*, IP is a common meeting place for people, ideas and knowledge; and hence it is a center of learning of new knowledge and meeting new people. The pool of information contributed by participants of the platforms from their sphere of knowledge and area of specialization (on the “what” to do and “how” to do of a given action) is synthesized and enriched through discussions. This allows the various actors to acquire new knowledge (weighing scales and price standardization, new farming techniques, best timing of output marketing), meet new people (new buyers or sellers) and accomplish tasks more easily.

A platform structure can be beneficiary for all and may initiate new relationships or enhance existing ones between the stakeholders involved. Input traders for example have the chance to communicate with farmers on the type of fertilizer and seeds they require.

Regardless of whether these members live in the same vicinity or not, they can at least exchange contacts hoping to share market information or engage in transaction in latter dates thanks to the mobile telecommunication revolution. In this sense, although the value chain actors such as producers, traders and processors may not actually engage in transaction activities, there is a chance for an improved business customer relationship in future. It will at least create option for actors to acquire and compare market information from different places rather than being bounded to the information obtainable within their own village or any other defined boundary.

Within the same discussion, farmers could get the advisory help of researchers and policy makers besides their own experiences. Farmers learn from researchers through trainings organized by the platform facilitators and through on-farm demonstrations. Researchers in turn learn from the farmers because the trainings involve discussions based on local circumstances and experiences. Supportive stakeholders such as policy makers also have the chance to grasp the needs and priorities of the ‘policy users’ based on the issues discussed in the meetings. This makes the development interventions and research activities taking place through IP approaches different from the widely practiced conventional top-down approaches. The IP facilitates information flows in multiple ways between groups and within groups. Information and knowledge are inputs as well as outputs for the platform while synergies improve the quality of information and its applicability for problem solving. Members of the platform come up with ideas that could have not been significant if retained and used by an individual and then find common (negotiated) solutions to their problems.

#### 2.4.2 Types of innovation platforms

By reviewing twelve case study reports on IPs from nine SSA countries, *Nederlof et al. (2011)* came up with four different types of IPs. This classification is based on the objectives of the projects and the role of research within the platforms. Some platforms are oriented towards improving livelihoods through practical development intervention while others are meant for learning new ways of tackling a development problem through practical application of new methodologies.

The four typologies are learning and research-oriented; development and research-oriented; development and non-research oriented; and research in to use (*Nederlof et al. 2011:31-34*). The first two have a more research orientation whereby researchers take the

lead in advancing the learning and development of new knowledge. In these two cases, the role of researchers is significant as they have to undertake formal studies of the IP projects starting from proposal development until the impact assessment stages. Researchers take the initiative to test the approach through practical application. Even though the processes in such types of platforms may involve either impacting the level of development of a given community or learning through experimentation, the final goal is to examine whether the practical experiences from such platforms could be instrumental in designing better strategies for future development. Hence, they are research-oriented and take other stakeholders as rather passive participants. This, however, may not be the case in action research where every stakeholder is considered to play an active role.

On the other hand, in the ‘development and non-research oriented’ platforms, the initiative comes from the participants and the members’ commonly design the objectives of the platform and define the strategies to achieve them. The role of the researcher in this case is to give support to an autonomous group by contributing scientific knowledge and acting as a stakeholder. The aim of such platform is to bring different views and interest groups together and make a concerted decision in order to help improve the livelihoods of the members concerned in a way agreed upon by them. The fourth type of IP identified by *Nederlof et al.* (2011) is the ‘research into use’, which involves a better collaboration between the scientific community and the users of the research outcomes within the platform. This last type is a mechanism of applying proven research outcomes to solve prevailing problems. An example of this is Farm Inputs Promotions (FIPS) project in Kenya. FIPS, although may not seem to qualify as an IP in the strict sense, is a network system established to support private sector-driven initiatives to get research outcomes into use (*Gildemacher and Mur 2012:70-94*).

### 2.4.3 Challenges in measuring impacts of innovation platforms

Evaluating the impacts of intervention projects can be challenging as often there is a lack of high quality baseline data, the difficulty of isolating the impacts of other factors, observed or unobserved unintended effects, as well as complex dynamics of the projects and the technological systems (*Nederlof et al. 2011:55*). Measuring the impacts of forums such as IPs using the usual mechanisms of project evaluations could be an even more challenging task. *Nederlof et al. (2011)* reported that most of the case studies they have reviewed have described several impacts of the projects. These include improved interaction and joint action between different stakeholders, better adapted technologies,

new ways to commercialize certain products, strengthened organization of farmers, and enhanced capacity of key platform members (*Nederlof et al. 2011:55*). *Nederlof et al.* questioned the strength and credibility of those reported impacts because of a lack of a mechanism to prove the significance of those impacts.

The IPs in the Volta2 project were established mainly to improve actors' knowledge and to increase interactions and cooperation so as to improve the performance of the value chains. The platforms are mainly forums for interaction; and changes in most of the attributes such as increased knowledge, interaction, information sharing, innovative capacity, market access etc. are mostly qualitative in nature and are difficult, if not impossible, to observe and assess quantitatively. The short life span of the IPs also creates additional challenge. It is not easy to know whether the perceived changes (if any) in the performance of members during this period is significantly associated with the impact of the platforms as there were other development interventions in the communities to the extent that it could confuse even the participants to which project a given benefit is related. Furthermore, the role played by changes in technology that allow groups to use better means of interaction (communication), and the natural tendency of modernization and globalization could significantly change social dynamics. Thus, measuring the impact of a specific project is quite challenging. The study uses mixed methods research approach to cope with the obvious challenges posed by the mentioned reasons.

### 3. Literature Review

#### 3.1 Introduction

There is growing consensus among scholars, governmental and non-governmental organizations working on development that the world population, especially in the developing regions, is rapidly increasing and thereby creating enormous challenges. Thus, there is a need for improving productivity and market access to meet the rising demand for food, feed and fuel. However, a larger share of agricultural producers in those developing countries, particularly in SSA, are smallholder farmers who produce for subsistence with less capacity for innovation and commercial farming (*Amankwah et al. 2012*). Agriculture still contributes up to 80% to employment and more than 30% to GDP in SSA for example (*Adekunle and Fatunbi 2012*). Thus, the sector has attracted the attention of development agencies and policy makers as a major area of intervention to improve food security especially in developing countries. The efforts of many research institutes to bring about the required technological innovation also often had rather limited reach as this is only a single element of the required concerted efforts to address the problems of food insecurity (*Rooyen and Tui 2009; Asres et al. 2012*). There is empirical evidence that the option of technology-led productivity increase alone failed to bring sustainable livelihood changes so far, especially in SSA (*Huis et al. 2007; Nederlof et al. 2011:13; Hounkonnou et al. 2012; Nyikahadzoi et al. 2012*). This has led to suggestions and attempts to develop enabling institutional contexts in which the objective of increasing productivity at the household level is coupled with improving the functioning of the market along the value chain with improved access to information and capacity development in order to benefit from the market infrastructure.

The availability of relevant information at the right time and the modes, frequency and adequacy of communication influence the kind of decision taken at each level of the value chain (*Fischer et al. 2008*). As recognized in the new institutional economics and transaction costs economics literature, market imperfections are rather the norm than an exception and the resulting impact on market outcomes are the highest when the actors differ in their capacity to access information (*Williamson 1991; Furubotn and Richter 2010*). These effects are much pronounced especially on smallholder farmers who are at a disadvantaged position relative to the traders to which they sell their produce because of differences in access to market information (*Amankwah et al. 2012*). Generally, information and communication could be as much important to smallholders as they are

to large scale commercial farms. Besides market related communication within the value chain, actors can benefit from improved information, which affects productivity, such as information on access to productive resources, sources of credit, weather forecasts, available crop/livestock varieties, production techniques, pest and disease outbreak and management, etc. (Macnamara 2009).

It is also argued that communications could work better and improve access to markets, in addition to reducing the above non-market information problems, when actors are organized in collective structures such as IPs with joint (or overlapping) objectives (Devaux et al. 2007; Markelova et al. 2008; Devaux et al. 2009). Devaux et al. (2009) have shown how a participatory market chain approach and stakeholder platform with intensive communication between and within groups of producers, market agents and agricultural service providers in the Andean native potato sector has created new market niches through commercial, technological and institutional innovations. This has been the result of common interests, sharing of market knowledge, and developing new business opportunities that improved access to markets. In a similar study, Markelova et al. (2008), have conceptually and empirically demonstrated how collective action institutions can serve to improve market access especially for the rural poor by addressing inefficiencies, coordination problems and barriers to market access. It then comes clear that the extent, mechanisms and strategies through which such collective organizations communicate and share market information depends on how they have been formed and on how they function. This then could have a bearing on the actual access to markets, which indicates performance. A summary of the literature reveals that there are no single panaceas on how such collective organizations should be structured and how that may lead to certain outcomes.

The following sub-sections provide additional empirical literature on the study of IPs. The sub-sections highlight the development outcomes of IPs as well as the possible links between the three elements of the SCP framework in the context of IP projects. SSA is leading in terms of attracting IP projects. Thus, the largest share of the available stock of literature on this evolving approach covers projects in SSA. The review emphasizes on articles and reports based on practical field experiences and case studies in order to better understand and describe the workings of IPs in similar settings as the current study.

### 3.2 Major development outcomes of innovation platforms

IPs can be instrumental in bringing practical and sustainable development outcomes especially for smallholder farmers mainly by building the capacity to innovate among other things (*Gildemacher and Mur 2012:105*). There are several cases of IP implementation and impact evaluations in SSA with a focus on improving livelihoods and increasing innovative capacity. A project evaluation report on the Nyagatare Maize IP in Rwanda has demonstrated how interactions in such networks can be helpful to improve farmers' access to input and output markets among other things. This example has also revealed how IPs can be dynamic spaces of interaction through which further interactions and joint actions shape and reshape objectives and actions towards a better way in solving common issues (*Gildemacher and Mur 2012:132; Cadilhon 2013*). The Nyagatare Maize IP report has shown a shift in the focus of the platforms from the initial objective of increasing productivity towards improving access to credit, storage, post-harvest handling and marketing (*Gildemacher and Mur 2012:107*). This is one success story for the establishment of such multi-stakeholder networks with dynamic interactions between all members and the role of collective action in addressing development challenges of smallholder agricultural societies. Yet, this case has also shown that lack of sufficient ability to analyze value chain and market systems has limited the capacity of the platforms to formulate and implement adequate solutions for post-harvest and marketing problems (*Gildemacher and Mur 2012:107*).

A report on Farm Inputs Promotions Africa (FIPS), a best bet project in Kenya, also shows that IPs are detrimental in improving farmers' access to market and altering marketing relationships. It has clearly demonstrated how the previous dependence on dominant input suppliers (which used to charge higher prices, were non-dependable and present only in the main cities) have been replaced by localized multi-purpose associations called village-based advisors (VBA). The change has come with localized and need-based advisory services on the application of locally adapted inputs and improved technologies to the benefit of the farmers. As evidenced by the project evaluation report, farmers' incomes and access to markets for inputs as well as outputs has improved after the formation of the network (*Gildemacher and Mur 2012:74*).

A recent study on a smallholder dairy development IP, also in Kenya, by *Kilelu et al. (2013)* indicated that joint actions of multi-stakeholders organized as IPs have enabled smallholder dairy farmers to improve both dairy production and market access by

reducing the bottlenecks surrounding the sector. It indicated how institutional innovation i.e., establishment of new form of a limited liability company called Dairy Farmers Business Association (DFBA) helped in remodeling the existing dairy cooperatives whereby farmers were encouraged to buy shares to ensure their commitment in the program. This has resulted in an enhanced flow of market information and improved marketing relationships among the value chain actors. The results indicated that linking dairy farmers with commercial banks through the new organizational form and forging new forms of engagement between buyers and sellers through East Africa Dairy Development (EADD) brokered negotiations for supply contracts between dairy producers association and milk processing companies resulted in an increased production, an improved delivery to the market as well as higher returns for farmers (*Kilelu et al. 2013*).

However, if certain conditions on the objectives and processes of establishment are not fulfilled and the process not managed well, such networks may prove to be failures and bring insignificant outcomes both at the household level for members and at the macro level, in terms of developing the capacity to sustaining the innovation process. This has been the case in the Malawi Pig Farm IPs established to create a better link between supply side and demand side actors of the Pork supply chain. The Pig IPs did not bring significant results for several reasons. There seems to have been an excessive top-down intervention by the government in terms of defining priority areas for the focus of the platforms and dominating the self-generated common objectives of the platform members. This coupled with financial resource limitations, the platforms ended up only with constructing slaughterhouses and market facilities. This in turn limited the chance for interactions and communications between the relevant actors beyond building a physical infrastructure, especially in the early stages of platform establishment during which dialogues and needs identification are most important. Building physical infrastructure as a government policy direction rather than following a needs-based approach, led to a series of later adjustments in the way the platforms functioned and the objectives that were achieved (*Gildemacher and Mur 2012:138*).

Based on a meta-analysis of twelve case studies in nine SSA countries *Nederlof et al. (2011)* also identified several development outcomes attributable to IPs. These outcomes include, but are not limited to, the identification of new opportunities for change; improved articulation of needs; a higher number of business deals; improved conflict

resolution and problem solving; policy advocacy; and improved stakeholder organizations. Some of these outcomes coincide with most of the development outcomes identified in other cases (see for example *Adekunle and Fatunbi 2012; Gildemacher and Mur 2012; Kilelu et al. 2013*).

### 3.3 Evidence on relationships between structure, conduct and performance of innovation platforms

All cases of network relationships considered here, to some extent, indicate the link between structure, conduct and performance. The Kenya FIPS project has demonstrated how involvement of multiple actors such as the private sector (seeds and fertilizer companies), research institutes, farmers, agro-dealers, distribution networks, and local coordinators and collaboration between them resulted in improved market access for both the farmers as well as the private companies. This has particularly demonstrated how the interaction between input suppliers and farmers has changed after the introduction of the IP approach. Due to increased interaction between the market chain actors members have better communication on the type and size, time and location of delivery and price options on seeds and fertilizers; and this has improved their access to market (*Gildemacher and Mur 2012:74*).

The Rwanda Maize IP case has also demonstrated how the collaboration among various actors such as the private sector, research institutes, farmers, distribution networks, funding agencies and government could result in improved farmers' Maize productivity, market access and capacity to innovate. The Rwanda case was based mainly on the objective of improving the position and role of farmers as main players. Choosing farmers as central players in such development interventions rather than passive recipients has the potential to improve the capacity to innovate through capacity building and improved coordination between key development actors. Their improved decision making capacity brought about better coordination and trust on the side of farmers. This in turn has made the platform to achieve better innovative capacity and improvement of farmers' livelihoods (*Gildemacher and Mur 2012:105*).

*Nederlof et al. (2011:31)* also demonstrated how the manner in which such networks are established, the types and number of members it constituted, and the legal and commercial structures supporting it, can determine the strategies and levels of interaction between members. This will have clear implication on the performances of these

members. It can affect access to inputs and farming technology for the farmers, access to markets for the input suppliers, capacity for further field experimentation for the research institutes, and the chance and potential for testing this innovative development approach for all involved partners including the funding agencies (*Gildemacher and Mur 2012:69-96*).

A very interesting result showing the link between the three elements has also emerged from *Kilelu et al. (2013)*. *Kilelu et al. (2013)* has shown that there was a change in the organizational form of and the membership type in the milk association from the conventional and ill-functioning co-operative structure to a newly designed structure (i.e., DFBA). This has helped farmers to get direct involvement and stakes through buying shares and has resulted in upgrading their status as partners who can negotiate for better outcomes for themselves in a joint business company. Quoting the comments of farmers during the research, the report has in particular shown that new installation facilities for cooling milk and establishment of such new governance structures has in fact resulted in boosting up the confidence of farmers about accessing market for their produce (*Kilelu et al. 2013*). This means that changes in structure can shape the modes of interactions and strategies, which then determines how diverse actors perform in achieving their objectives.

In addition, the case of the Malawi Pork IP has shown that the ways in which the platforms are established, the availability of required funding and knowledge, the extent of dialogue at establishment and the lack of well-equipped legal structures to advise on the formation of the platforms can contribute to poor communication and sharing of information. This can affect the choice of what kinds of activities to prioritize in the process of innovation. This could in turn contribute to the failure of such projects implying a poor performance. The Malawi case is very important to consider because it can serve as a demonstration that structural issues at the IP project inception stage can shape the actions and modes of engagements or behaviors of the market chain actors and supportive institutional stakeholders, which may in turn bring outcomes that deviate from the original objectives of the relevant stakeholders. This can be taken as an important lesson for similar projects, and confirms that IPs are prone to failure if the process is not managed properly.

In general, these cases demonstrate the existence of a possible link between structure, conduct and performance in an agricultural value chains development based IP settings.

One rough conclusion that can be drawn from these cases is that institutional aspects, knowledge of the socio-economic dynamics, coordination among all parties and competent organizational structure should complement technological innovation, all of which are key factors that may contribute to the success and sustainability of such concerted and innovative development approaches. These cases, being applied to market value chains development, can validate and support the claims of the conceptual framework being developed at ILRI for evaluating the impact of IPs on marketing relationships through application to the Volta2 IP projects and subsequent researches in other regions.

## 4. Background of Volta2 Project and Socio-economic Context of the Study Area

### 4.1 Volta2 Project background

The Volta Basin two (Volta2) project for Integrated Management of Rainwater for Crop-Livestock Agro-ecosystems under the Volta Basin Development Challenge (VBDC) was initiated in 2010. The project has the overall goal of improving rainwater and small reservoir management in Burkina Faso and Northern Ghana to contribute to poverty reduction and improved livelihoods resilience, while taking into account downstream and upstream water users including ecosystem services (*CPWF 2010*). The project aimed at achieving three specific objectives: 1) increasing crop and livestock productivity through identifying, evaluating and disseminating best-fit rainwater management strategies, 2) improving water productivity at farm level and 3) increasing the capacity of actors through IPs to access and use relevant knowledge on rainwater management. The project has been implemented by a consortium of partners namely: International Water Management Institute (IWMI), Council for Scientific and Industrial Research-Animal Research Institute (CSIR-ARI) of Ghana, Agricultural and Environmental Research Institute (INERA), University of Wageningen - Plant Production Systems (WUR-PPS), and Netherlands Development Organization (SNV) (*CPWF 2010*).

In Ghana, the project has been implemented in four communities Namely; Digu and Golinga in Tolon-Kumbungu district of the Northern region and Naburinye and Orbilli in Lawra district of the Upper West Region. At the beginning, four IPs have been established (one IP in each community) through the facilitation of SNV Ghana. The first IP meetings took place on the 14<sup>th</sup> and 15<sup>th</sup> of July, 2011 in Digu and Golinga communities and were attended by 29 and 58 participants, respectively (*SNV Ghana 2011*). Out of the total number of participants, 28 were women. In Lawra, the first IP meetings were held on the 26<sup>th</sup> and 27<sup>th</sup> of July, 2011 in Naburinye and Orbilli communities and were attended by 45 and 50 participants, respectively. Out of the total number of participants, 24 were women. In the second and subsequent IP meetings, the number of IP members has been reduced to about 24. The total number of IPs was also reduced to two by merging the set of communities in each district (*SNV Ghana 2011*).

The participants of the first IP meetings consisted of several stakeholders. These include farmer groups (producers), input dealers, processors, traders, representatives from traditional rulers or community chiefs, representatives from the Ministry of Food and

Agriculture (MoFA), Veterinary Services Department, Animal Research Institute, Irrigation Development Authority, Savannah Agricultural Research Institute, departments of cooperatives, University for Development Studies, Rural Banks, marketing companies and several NGOs such as SNV Ghana, World Vision and Plan Ghana (*SNV Ghana 2011*).

#### 4.2 Location of the study area

The Upper West region is one of the ten regions of Ghana. It is found in the North West corner of the nation bordered by two neighboring countries: the Republic of Burkina Faso in the North and Cote d'Ivoire in the West; and two other regions of Ghana: the Upper East Region on the East, and the Northern Region in the South. The political and commercial capital of the region is called Wa. Lawra is one of the nine administrative districts of the Upper West region. The district lies in the north western corner of the Upper West Region. It is surrounded by Jirapa district to the east, Lambussie-Karni district to the south, Nadowli district to the North and the Republic of Burkina Faso to the west. The district is found within 10°30'-11°North and 2°-3°West (*CPWF 2010*). Naburinye and Orbilli are located at about 5 kms and 6 kms respectively from the district capital Lawra.

The Northern region is the largest of the ten regions in terms of land area. It is bordered by two neighboring countries: the Republic of Togo to the east, and Cote d'Ivoire in the West; and four other regions: the Upper East and the Upper West Regions to the north and the Brong Ahafo and the Volta regions to the south. The regional capital of the region is called Tamale and it is one of the three metropolises of Ghana. Tolon-Kumbungu is one of the 20 districts of the northern region. The district is located to the west of Tamale at 9°-10° north and 1°-2° west. The district shares borders with West Mamprusi district to the north, West Gonja district to the west, Savelugu/Nanton district to the south and Tamale Municipal to the east. Digu and Golinga communities are at about 22 kms and 11 kms respectively from Tamale (*CPWF 2010*).

#### 4.3 Population size and distribution

The 2010 National Population and Housing Census of Ghana puts the population of Lawra district at 100,929 (51.8% female). Of the total population, about 87% live in rural area. The religious composition shows the numerical dominance of Christians with 57% followed by Traditional African Religion 36.46%. Muslims constitute only about 4.19%.

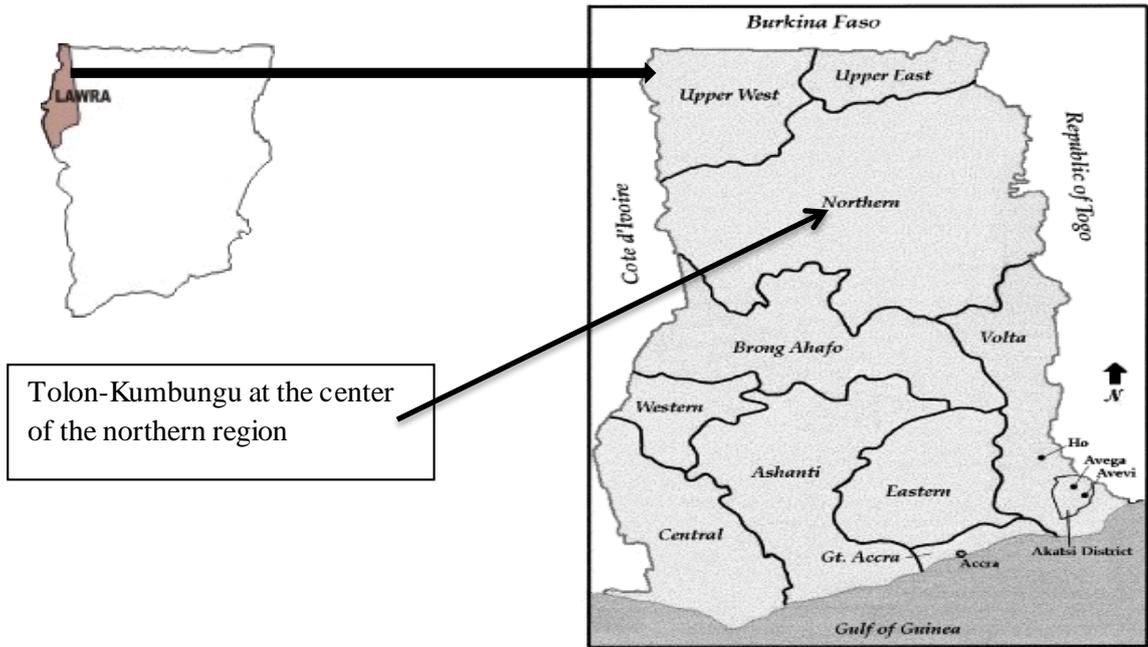
The census also shows the population of Tolon-Kumbugu in the same year as 112,331 with women constituting 50.1%. The proportion of rural dwellers to the total population is very high at 92% (*GSS 2012*). Tolon and Kumbungu are separated in 2012 and stand as individual districts when this survey is conducted.

#### 4.4 Socio-economic context

The dominant economic activity in the two districts is agriculture, both crops and livestock production. In both districts, women are involved also in trading and small-scale processing of agricultural products. Several types of crops and livestock are produced in the four communities. The major ones are Rice, Maize, Soybeans, Yam, Millet, Sheep, Goat and Poultry. For all kinds of products, there are similarities in the players in the value chains, which include farmers, two levels of intermediaries (including market queens who accept products at the market), processors (including slaughterhouses and butcheries in the case of livestock) and consumers. Two types of traders are involved: those who come to the village (also includes village traders) who buy locally and sell to the main markets and those who wait at the markets and buy in bulk from the small traders. The Upper West region is known for its Pito, a mildly alcoholic beverage traditionally brewed from Millet. The Pito is drunk from what is called calabash and sold mainly in open air or under tree shades. The locals believe that drinking Pito keeps the body strong and healthy: they believe that Pito reduces the chances of Malaria. It is also a means of coping with the afternoon heats when temperatures reach up to 40 degree Celsius.

There are several markets used for marketing of inputs and outputs in Tolon-Kumbungu. The main ones are Tamale, Digu, Nyankpala, Sungkpagla, Katinga, Tolon, Kumbungu, Vogu and Yapei markets. The main means of transport are Motorbike, bicycle, walking and tricycle. These markets normally do not differ for IP members and the rest of the community. The main markets used by the two communities constituting the Lawra IP include Babile, Nandom, Eremon and Lawra. Lawra is the central and main market as it is also the administrative capital of the district. There are limited means of transport for the two communities to convey products to Lawra and other markets. People usually walk to the markets, as there is limited means of modern transport. They carry crops on their heads and walk miles. This is usually the case for women. The project proposal for the Volta2 project indicates that market access in Lawra was 'limited' whereas the access to market was designated as 'very good' for Tolon-Kumbungu (*CPWF 2010*).

Figure 3: Map of the Republic of Ghana and its 10 administrative regions



Source: Diamenu and Nyaku 1998 and Google map.

## 5. Materials and Methods

### 5.1 Data and measurement

The study is mainly based on primary data collected from the field in two regions of northern Ghana. Cross-sectional data was collected from the four communities: two (Orbilli and Naburinye) in Lawra district of the upper-west region and two (Digu and Golinga) in Tolon-Kumbungu district of the northern region. In a two-month long stay in the field sites, data was collected from diverse groups; those being part of the IPs as well as other related stakeholders. Project inception documents as well as workshop and survey reports, which serve as additional secondary information, were also used in order to obtain detailed information on the establishments, processes, organizations and objectives of the IPs. The data collection was conducted through methods that are more direct. This included two focus group discussions, semi-structured key informant interviews (see *Appendix 5*, *Appendix 6* and *Appendix 7*) and individual surveys of platform members (*Appendix 8*) in order to get in-depth information from the relevant stakeholders and value chain actors. Detailed information regarding the organization of the IPs have been collected from facilitators/organizers of the platform meetings and trainings. A scheduled quarterly meeting of the IP in Lawra was visited which allowed a first-hand observation of the actual interactions among the stakeholders during the meeting.

Both qualitative and quantitative data were collected. Quantitative information such as the age of the platform members, the number of members of the platforms, wealth level or household assets, household size, etc. were collected on an interval scale basis, while detailed qualitative information was collected through the focus group discussions and key informant interviews, as well as through direct observation of an IP meeting. In addition, a five-point Likert<sup>3</sup> scale based questions were used to collect information from individual value chain actors. This was done in order to obtain responses about

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<sup>3</sup> *The Likert scale is commonly used in social science research especially for obtaining data based on the respondent's degree of agreement to certain statements. Although there is a significant share of work which applied statistical analysis such as ANOVA, correlation and parametric regression analysis using data measured on Likert scale, there are disagreements as to whether conclusions based on parametric statistics derived from Likert data especially when the data is small in size, heteroscedastic and non-normal are plausible (Michael 1996; Russell and Bobko 1992; Norman 2010). Norman argued that while the central limit theorem can be used in large samples, it is also safe to apply correlation analysis even with small samples as the Pearson correlation coefficient ( $r$ ) is robust and insensitive to extreme violations of the normality assumption. Using real life data, Norman further illustrated that the difference between results of Pearson and Spearman's correlation coefficients is not significant even with highly skewed data set measured on a five point ordinal scale.*

respondents' attitude and level of agreement to certain statements representing the elements of communication and information sharing as well as market access.

The response categories for the Likert<sup>4</sup> scale has been considered sufficient to be limited to five (from 1 = strongly disagree to 5 = strongly agree) in order to reduce the complexity and the boredom of a larger response category. Questions on socio-economic variables have been systematically distributed throughout the questionnaire in such a way that it serve as refreshment to the respondent and further reduces boredom of the repetition of the statements of agreement (see *Appendix 8*). After administering a pre-test of the individual questionnaire and also taking into account the low literacy (see *Table 1*) rate of the predominantly rural farming society, a localized way of presenting the five scales has been designed in order to improve the understanding of the respondents about the meaning of the five points in the scale. All of the numbers have then been represented from one to five by a corresponding set of stones and put in front of the respondent. A single stone was put on one end and five stones on the other end of the order (one stone to represent 1 and five stones to represent 5) with the rest in the middle in their order (see *Appendix 2*). Respondent was then asked to indicate his/her choice using a stick while sitting. In places where using stones were not feasible, visibly drawn zeros (on the ground) were used to represent the numbers. These practices is believed to have helped especially the farmers who did not have basic education to make the numeric comparison and easily relate it to their responses based on their level of agreement.

The qualitative data from focus group discussion and interview of IP facilitators and key informants have been used to understand and explain the overall relationships among the stakeholders. This also helped to back the results of the quantitative analysis when the analysis generates unexpected results. The quantitative analysis is made based on socio-economic data and ordinal-scale based responses collected from the value chain actors within the IPs. The socio-economic data mainly relates to the involvement of the members in the IPs. The ordinal-scale data from the Likert-type statements have been transformed to interval data using factor analysis (see section 4.4 and section 5.5 for the procedures) and later used in the econometric model.

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<sup>4</sup> Another point of dispute regarding the use of Likert scale is the number of response categories for the statements. While the use of lower response categories below seven have been criticized for being insensitive and inappropriate especially if we want to use the data for statistical and econometric analysis (Cummins and Gullone 2000; Russell and Robko 1992), there are cases in which lower categories have been used (Vannatta and Fordham 2004), and be more appropriate to avoid boredom for the respondents which may lead to systematic responses.

## 5.2 Previous methodologies used for innovation platform impact evaluations

A report on the Nyagatare Maize IP in Rwanda has employed exploratory approaches to evaluate whether the Maize IP has enhanced the capacity to innovate and whether it has contributed to improving the food security at the household level. Project start-up and validation workshops and a series of IP meetings have served as the main mechanisms for evaluating such impacts. Moreover, focus group discussions at different levels, key-informant interviews, household surveys, and stakeholder perception assessments have been used for gathering information (*Gildemacher and Mur 2012:104*).

A cost benefit analysis was used to check the sustainability of a village based advisory (VBA) unit supporting the network in the case of the FIPS project in Kenya (*Gildemacher and Mur 2012:70*). Similarly, impact evaluation of the Pig value chain IP in Malawi has employed household surveys, which included control groups (also as in the case of Nyagatare Maize IP), key informant interviews, focus group discussions and documents' based desk research as ways of identifying success factors and evaluating effects of such interventions (*Gildemacher and Mur 2012:133*). Using a more descriptive approach, the Malawi Pig IP has assessed the impacts based on sustainability and value for money criteria. As emphasized in most of the reports on IPs, one major problem with the impact evaluation is the lack of baseline data against which comparison can be made to determine the changes in outcomes related to the variables of interest resulting from such new approaches. Project evaluation studies usually use retrospect based on document reviews and stakeholder perceptions. This was also the case in the Rwanda Maize and the Malawi Pig IPs' impact evaluations.

*Kilelu et al. (2013)* has also applied similar exploratory approaches to the case study in Kenya to disentangle the role of IPs in supporting co-evolution of agricultural innovation processes (*Kilelu et al. 2013*). The case by *Kilelu et al. (2013)* chose two specific sites for the study and augmented data gathering by formal and informal involvements in workshops, meetings and direct discussions through participation to make in-depth observation of the processes and outcomes of the IPs. The way *Kilelu et al. (2013)* conducted the study demonstrated the superiority of participatory research in revealing a more realistic understanding of the behavior of actors in networks such as IPs.

## 5.3 Methodological approach

### 5.3.1 Research design

Since the objective is to investigate the structure and nature of interaction and assess particularly the marketing relationships among the value chain actors in the IPs, the study did not cover members of the community who are not IP members. In addition, the survey covers the entire IP membership as much as possible instead of drawing a sample from it. This is partly due to the small size of the total number of IP members. The total number of participants in the current Volta2 IP project in Ghana barely exceeds 40. These numbers are in the order of 20 in each district and the IPs are formed on a district level by combining two communities in each case. Some of the traders, processors and other stakeholders are from nearby towns and others are small-scale rural based operators. Farmers are those settled in the rural communities of the respective districts. These rural farmers constitute more than 80% of the IP membership.

In addition to the value chain actors there are other stakeholders, which are not directly involved in the value chain activity. These other stakeholders deal with organizing/facilitating of the meetings, trainings and workshops, funding, staffing, research and similar issues rather than direct involvement in the marketing activities in the value chain. The research institutes for example are engaged only in doing practical research through the Participatory Action Research (PAR) to assist the farmers in improving productivity and natural resource management (such as soil and water conservation). Therefore, the main source of data for the assessment of the functioning of the value chains and the interactions between the actors are the farmers, traders and processors. In fact, qualitative data obtained from facilitators and key stakeholders have helped to understand the overall setting and build the possible links in the framework, which was later verified by the results of the quantitative model. The qualitative data have also helped to explain the results of the quantitative analysis. This study thus used a mixed method approach.

### 5.3.2 The debate over quantitative, qualitative and mixed methods research

The polarization over the choice between quantitative and qualitative methods has been evident in almost every discipline. Therefore, there is a need to understand the pros and cons of both quantitative and qualitative approaches. Quantitative research provides generalizable information for a large group of people based on experiments and surveys

(Creswell 2004:15). This research approach has been dominant until the 1980s (De Lisle 2011). The approach came under attack especially during the 1970s when the interest for qualitative research started to gain momentum (Morgan 2007). The main limitation of the quantitative approach rests on the argument that it does not provide satisfactory answers, reasons and explanations behind the results generated by statistical procedures. Qualitative research on the other hand helps to explain the meaning and context regarding the underlying social relationships, the people and the study environment. It is mainly the case in Narrative research, Case studies, Ethnographic study, Grounded theory and Phenomenological research (Creswell 2004:16-17) in which the researcher engages himself/herself to understand and explain the social facts which cannot be quantified.

Both proponents and opponents of the two polar techniques have shown the superiority of one research method over the other. However, in recent years, it seems that these two views have been converging to support a mixed methods research approach. Although many writers put the birth of the mixed methods research to be around the end of the 1970s, Rocco *et al.* (2003) and De Lisle (2011) argued that the practice of integrating the two polar approaches dates back to the 1950s. Johnson *et al.* (2007) defined a mixed methods research as:

*“...the type of research in which a researcher or team of researchers combines elements of qualitative and quantitative research approaches (e.g., use of qualitative and quantitative viewpoints, data collection, analysis, inference techniques) for the broad purposes of breadth and depth of understanding and corroboration”* (Johnson *et al.* 2007:123).

Johnson *et al.* (2007) argued that a mixed methods research is not a single paradigm. It consists of three varieties: qualitative mixed, pure mixed (equal status) and quantitative mixed. Thus, based on the research question and the nature of the context, a researcher may follow a qualitative dominant mixed method or a quantitative dominant mixed method research design or tries to keep balance of qualitative and quantitative elements.

Mixed methods research is often chosen when the researcher is in a situation where the statistical or other quantification procedures in quantitative methods are not adequate to address the research questions. A mixed methods approach is preferred also when the finding of a qualitative research cannot be generalized due to the small numbers and narrow range of participants (Rocco *et al.* 2003; De Lisle 2011). Therefore, the use of

mixed methods approach improves the capacity of the researcher to obtain better results particularly in social science research where understanding the social facts is very important. Applying mixed methods help the researcher to measure the significance or strength of relationships between variables through statistical procedures and also give the chance to explain the nature of the relationships. It is particularly helpful when the reasons for a certain kind of relationship, the social dynamics and the behavior of participants cannot be quantified. According to *De Lisle (2011)*, it is very crucial for a researcher to use a mixed methods research methodology for triangulation. However, *Sale et al. (2002)* argued that quantitative and qualitative methods cannot be combined for cross-validation or triangulation purpose when they do not study the same phenomena. It is more appropriate when the combination is for the purpose of obtaining complementary results (*Sale et al. 2002*). *Yin (2006)* also argued that combining qualitative and quantitative methods in a single study can broaden and strengthen the study because of the complementarity of the results.

This study tries to assess the impact of IPs on marketing relationships in a rural community setting in which divers actors are involved. The debate over which method is superior does not seem to be settled yet. But, the momentum in the ongoing debate suggests the superiority of the mixed methods research with varying degrees of dominance by either the qualitative or quantitative component. The quantitative method is important to be able to measure the significance of relationships between certain variables whereas the qualitative method helps to describe social relations and explain unquantifiable situations. This therefore justifies the reason why this study uses mixed methods approach.

#### 5.4 Method of analysis

The study employed a mixed methods research methodology. Both qualitative and quantitative methods are combined for every level of the study from the data collection to the analysis. The qualitative data from the focus group discussions and key-informant interviews is used to analyze the contexts and discourses of the discussions to reveal important results in regard to the relationships between the different elements of the framework, the formal and informal links between the value chain actors, the key institutional stakeholders, as well as the structure of the platforms in general. The qualitative assessment is based on the explanation of different actors and the observations during the meeting and focus groups discussions. Data from other stakeholders and key

respondents is used to qualitatively build the relationships among the elements of the conceptual framework, which was in fact validated through the quantitative analysis. The data from these key respondents is also essential to broaden the understanding of how the IPs were organized, the challenges they have faced, and some of the strategies taken to improve the platforms.

Thus, qualitative analysis of the facts from key respondents, facilitators as well as focus group discussions and reports of meetings have been followed by a quantitative analysis to examine the relationships between the different elements of the SCP hypothesis. Detailed graphical inspection as well as other tests and preliminary descriptive assessments are conducted on the quantitative data prior to any analysis. Since the number of statements representing the elements of conduct and performance are large and could be correlated (at least per element), conducting a factor analysis was chosen in order to have a reduced number of fairly uncorrelated underlying factors (representing groups of correlated statements) and to facilitate further empirical analysis. This is applied to the set of statements representing communication and information sharing as well as improved market access. The quantitative analysis does not take numerical information on changes in outputs, prices and other variables into account because of the short lifespan of the platforms. Instead, it is based on a measure of the perception of the participants about changes in marketing, interactions within the platforms, decisions they take to get market information, their level of communication, and resulting changes in access to markets. The variables are, thus, measured based on the psychometric responses of interviewees to Likert-type statements.

The use of the factor analysis is aimed to solve two possible interrelated issues in the data. On one hand, it helps to reduce the number of variables and makes the model more parsimonious and easier to interpret. On the other hand, it solves the problem of multicollinearity caused due to the potential relationships among the several statements. Multicollinearity was checked formally after the factor analysis using the Variance Inflation Factor (VIF) to investigate any possible correlations among the reduced number of factors and other socio-economic variables used as explanatory variables in the regression.

Before conducting the actual factor analysis, the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the Bartlett's test of sphericity are used to ascertain whether conducting the factor analysis with the given data and the obtained results would be

appropriate. Most empirical studies suggest a KMO of greater than 0.6 because it suggests the adequacy of the partial correlations among the items. For the Bartlett's test of sphericity, the usual significance level of 5% is chosen to test whether the correlation matrix of the variables is an identity matrix and hence conducting a factor analysis is justified or not.

After the appropriateness of the factor analysis model is checked through the KMO and Bartlett's tests, the factor analysis is conducted using the principal components factor with the Kaiser Normalization option. The principal components factor helps to produce  $n$  numbers of uncorrelated factors that could explain a significant level of the total variation in the individual items jointly. To check the relevance of including each variable in the factor analysis, it was also checked if the uniqueness (one minus communalities) is less than 0.5 or alternatively communality is greater than 0.5. Eigenvalue of greater than one is then used as a cut-off point to decide on the final number of factors to be retained for further analysis. Visual inspection of scree plots have also been used to validate the results of the Eigenvalue criteria. Varimax (orthogonal) rotation is used to obtain a rotated correlation matrix to facilitate the interpretation. After executing the factor models, the scale reliability coefficient is checked to verify the internal consistency of the models using Cronbach's alpha.

Once the number of uncorrelated factors has been determined and rotated factors are obtained, one common issue is how to combine the individual variables that represent each factor for further analysis. Based on the factor loadings of each statement (variable), statements that significantly contribute to a given factor were combined<sup>5</sup>. Following Wu (2007), after determining the number of factors, the factor scores of each factor is predicted from the corresponding data to obtain estimates of the value series of the new factors representing the set of items for each respondent. For the elements of conduct, this is easily done because any number of factors that the model suggests can be taken as independent variables of the econometric model.

For the statements that represent market access, which the model uses as its dependent variable, it may also happen that the program suggests more than one factor. In that case, various statements may be aligned to the different factors, which necessitate a closer look

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<sup>5</sup> This can be done by taking the mean of the responses on each of those statements for each observation or deriving the factor scores through some special algorithms that also take the frequencies of the responses into account (Wu 2007).

at the individual statements contributing to the variations in the factors based on their factor loadings. Therefore, for completeness, a full factor analysis is conducted in order to check for the potential superiority of the factors in representing market access. This was also used to obtain various aspects of market access.

Based on the reduced number of these indicators of conduct and performance together with certain elements of the structure of the platforms, a semi-logarithmic multiple regression is employed to check if a significant relationship exists between the elements of the SCP framework. The widely applied Ordinary Least Squares (OLS) method is used for estimation. The use of a general semi-logarithmic multiple regression is justified because factor analysis helps to generate continuous factor scores to be used as response variables (Wu 2007). To undertake a multiple regression, data is diagnosed for suitability because the method requires the fulfillment of distributional assumptions. For the OLS estimates (betas) to be valid, the error term needs to follow a Gaussian distribution. One potential challenge here is that given the small size of the data, the individual variables as well as residuals may not follow normal distributions. Wu (2007) shows that combining the various Likert-type items using transformation algorithms or any mechanism following a factor analysis could make the data set better conform to normality. The Shapiro-Wilk W test for residual normality, the Breusch-Pagan/Cook-Weisberg test for heteroscedasticity and the Ramsey RESET test for omitted variables bias are conducted after the estimation of the equations. Such diagnostic tests are conducted to affirm the validity of the results and use robust options or transform the data in case the model fails to pass the tests. To determine the statistical significance of each explanatory variable, the t-test statistic and the corresponding P-values are used. The R-squared is also used to check the overall fit of the regression model.

The econometric model for validating the conceptual framework follows the form:

$$marketaccess_j = \beta_{0j} + \beta_{1j}IP_j + \beta_{2j}gender_j + \beta_{3j}age_j + \beta_{4j}lnnbhous_j + \beta_{5j}incestm2_j + \sum_{i=1}^n \beta_{6ij}communication_{ij} + \varepsilon_j$$

Where -  $marketaccess_j$  represents the factor that explains the  $j^{th}$  dependent variable of market access.  $IP$  is a dummy variable that assumes 1 for Tolon-Kumbungu and 0 for Lawra to account for any possible differences between the two IPs (see *Figure 3* in *section 4.4*).  $Gender$  is also a dummy variable representing the gender of the IP member, which takes 1 for male and 0 for female and accounts for any possible impact of gender on market access. The variable  $age$  is the age of the IP member. The variable  $lnnbhous$  is

the natural logarithm of household size of the respondent and focus group discussions with villagers have determined that this indicator was used within the villages to refer to the social position of the resident. *Incestm2* is the annual income of the participants based on their own estimates (two outliers were replaced by mean values). The estimated annual income is used as a proxy for wealth while household size is also taken in a separate exercise, to compare the results, as it was one of the local wealth indicators. *Communication<sub>i</sub>* is the  $i^{th}$  variable or combination of variables that represents the level of communication and information sharing of a member. The values of  $i$  and  $j$  depend on the outcome of the factor analysis. The intercept term  $\beta_0$  represents the value of market access if the other variables are equal to zero and other  $\beta$ 's represent marginal effects. The error term  $\varepsilon$  is the residual of the regression models that absorbs all random disturbances and measurement errors including errors of aggregation. The quantitative analysis was conducted with the program Stata 11.0 on a Windows 7 operating system.

## 6. Results and Discussions

### 6.1 Introduction

As stated in the introduction, the study has the aim of testing a new conceptual framework through its application to the Volta2 IPs in Ghana. This is done by assessing the structures and interactions among the stakeholders of the platforms and its impacts on marketing interrelationships along the value chains. With the core aim of investigating the impact of the changes in the ways and levels of market related communication and information sharing between value chain actors on the potential improvements in market access, the study assessed the overall interrelationships among the members of the platforms. The possible differences between the Lawra IP and Tolon-Kumbungu IP in terms of gender composition, culture and religion, wealth levels, location, etc. and the impacts of such differences on marketing relationships have also been explored.

The following sub-sections present and discuss the main results based on data from the two-month long extensive fieldwork (including participant observation in a scheduled IP meeting in Lawra) and document review of various reports of the IP intervention. The results are generally organized under five themes: 6.2) the structure of IPs and members' interrelationships in northern Ghana; 6.3) main challenges, achievements and opportunities of the platforms in terms of enhancing interactions and improving market access; 6.4) communications and interactions within the platforms and the changing balance in market power; 6.5) factor analysis results and their validities and 6.6) validating the framework and identifying determinants of market access.

### 6.2 Structure of the innovation platforms and members' configuration

Following the classification of *Nederlof et al. (2011)*, the IPs under study can fairly fit to the 'development and non-research oriented' type (see part 2.4.2). The targeted development objectives, historical evolution, status and practices of the platforms support this argument. In fact, the platforms were initially proposed by external actors (mainly development organizations) as part of a development intervention targeting the communities along the Volta river basin; but the problem identification and priority setting for the activities of the platforms were mainly left to the members with a facilitation role of some of those initiating organizations or the implementing partners. The members were brought together by SNV, ARI and other stakeholders under the CGIAR initiative so that these members could discuss the development challenges of the various actors along the value chains and hence design better strategies to reduce those

challenges and improve livelihoods resilience. However, contributing to overall development being a long term plan for the stakeholders, it is the mutual learning and knowledge sharing that is the main focus as observed in the current stage.

Since July 2011, the platform members have been conducting quarterly meetings on a regular basis to discuss their matters and exchange ideas to design better solutions to the various bottlenecks. The platforms also organized a couple of trainings on issues such as improving crop and livestock production, rainwater harvesting techniques, post-harvest management and marketing. To strengthen legitimacy and scope of action, the platforms have been striving to be registered as formal multi-stakeholder organizations with defined rules and regulations. During an interview, the northern region's deputy leader of the Farmers Organization Network of Ghana declared that the IP in Tolon-Kumbungu district got recognition from the national government and registered as a cooperative by end of May 2013. They are registered with a specific name of "innovation platform for crop and livestock value chains"<sup>6</sup> with an index of the district's name and will be governed by the nation's cooperative law. The Lawra IP is also in a similar process. One of the topics on the agenda of the meeting attended in Lawra on 27<sup>th</sup> June 2013 was on how to form viable cooperative associations. The legal recognition of the platforms and their congruence with cooperative structures strengthens the assertion that IPs organized on value chains development fit to hybrid forms because of their intermediate attributes. However, until recently, the IP structures have been mainly used as interaction/discussion forums among the members to deliberate on issues of common interest rather than governance of actual market transactions among them.

The IPs are composed of various actors. In both platforms alike, there are various value chain actors as well as other supportive stakeholders (which are either facilitating the meetings and trainings, cover the funding requirements or are involved in policymaking and hence support members, etc.). The value chain actors are mainly composed of input dealers, agricultural producers (farmers), intermediaries (livestock dealers in particular), rural small-scale as well as urban recognized traders and processors. Other stakeholders include research institutes, donors, rural based or agricultural oriented financial institutions, government offices working on agricultural development (such as district cooperative offices and ministries of food and agriculture), and other organizers. There is no visible difference between the compositions of the two platforms in terms of the nature

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<sup>6</sup> *This was verbally reported by the interviewee based on a telephone conversation he was having with a liaison officer in Accra because the registration certificate was yet to be sent back to him in Tamale.*

of activities participants are engaged in. This is also mainly because of the fact that the platforms were formed to achieve the objectives of the same sub-project. Participants recognized as traders in the platforms participate in a number of value chain associations whereas the producers (farmers) are involved in producing crops and livestock in the villages. Most of the platform member farmers are small-scale producers with less business orientation. They depend to some extent on agricultural inputs provided by the project through the PAR project. The farmers group is also the most stable in terms of membership. While their formal membership in the IP is recognized as farmers/producers, some (particularly women) members actually generate their main source of income from either rural based agricultural trading or small-scale processing of products such as Maize flour and Pito (local beer) from Millet.

The types of value chains the platforms are organized on mainly include Maize, Groundnut, Rice and small ruminants (sheep and goats). However, the Lawra IP is working mainly towards Maize value chains development while Tolon-Kumbungu focuses on Maize, Rice, Yam and small ruminants at the same time. The lack of focus on livestock value chain in Lawra has been witnessed when the IP meeting of June 2013 started with a recap of the previous meeting in which they mentioned that they have agreed to work on Maize value chain through majority voting<sup>7</sup> against the option of small ruminants.

Although the types of actors within the platforms did not significantly change overtime, the exact numbers of members for the two IPs is not known. What is certainly known is that there are 16 farmers in each platform whose membership did not change<sup>8</sup> since the beginning. The 16 are involved in technology adoption through the PAR, which might be an explanation for their commitment because of the direct benefits associated with it<sup>9</sup>. The organizers in fact recently invited a few more farmers who have been participating in local meetings and on farm demonstrations. These new farmers started attending general IP meetings and trainings since March 2013, but did not yet directly benefit from the PAR.

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<sup>7</sup> *The main decision making mechanism for the IP is consensus among all members.*

<sup>8</sup> *A deceased female member farmer was replaced by her husband as a member in Lawra district.*

<sup>9</sup> *One of the main issues raised by the farmers during the meetings and the interview sessions is that the inputs (such as fertilizer, land and seeds) freely provided by the project is not sufficient and should be increased to make a difference in their life.*

The gender composition of the value chain actors included in both platforms is similar. Both men and women are almost equally represented (see *Table 1*). This is because the project from the very beginning selected value chain platform members based on the criteria of gender balance in addition to interest and the type of activity they are engaged in. While all men were married, about 28% of women were widows. However, due to socio-cultural reasons, women are not recognized as household heads or owners of the household resources even after their husbands died or have left them. This is much common in Tolon-Kumbungu as mentioned by participants during the focus group discussions. Traditionally, the oldest male household member (usually among the sons) is considered as household head in such circumstances regardless of his actual age.

Table 1: Respondent demographic profile

Variable	Tolon-Kumbungu		Lawra		Total	
	Frequency	%	Frequency	%	Frequency	%
Gender composition						
Male	14	61	11	55	25	58
Female	9	39	9	45	18	42
Marital status						
Single	0	0	0	0	0	0
Married	21	91	17	85	38	88
Widow	2	9	3	15	5	12
Age group						
20-34	7	30	4	20	11	26
35-49	7	30	9	45	16	37
50-64	7	30	2	10	9	21
65 and above	2	9	5	25	7	16
<i>Mean age</i>	<i>44</i>		<i>50</i>		<i>47</i>	
Level of Education						
Never attended school	20	87	13	65	33	77
Some basic education	1	4	0	0	1	2
Completed 8 <sup>th</sup> grade	1	4	4	20	5	12
Completed high school	0	0	2	10	2	5
Certificate/diploma	1	4	0	0	1	2
First degree and above	0	0	1	5	1	2
Primary activity						
Livestock farming	1	4.4	0	0	1	2.33
Crop farming	17	73.9	7	35	24	55.8
Mixed crop-livestock	0	0	9	45	9	20.9
Trading/input supply	3	13	3	15	6	14
Processing	2	8.7	1	5	3	6.98

Source: Compiled from raw data on socio-economic information of members

The age of value chain actor members interviewed range from 22 to 75 with a mean of about 47 years. While the age structure generally shows a fair distribution over this range, about 37 % falls in the strata of what may be considered as the experienced and yet productive working age group (35 to 49 years according to *Table 1*). Involving experienced members of the community in the IP could create a chance for better information and knowledge sharing without significantly affecting its impact on the sustainability of the platforms. This offers an opportunity for younger members to benefit from the knowledge sharing with the experienced members. This also contributes to improvement in intergenerational interaction to sustain agricultural life or food production and maximize benefits from existing best practices. In general, the platforms make it possible for people of various socio-economic backgrounds and individual characteristics to come together, share ideas and knowledge, and design negotiation mechanisms to solve certain problems.

### 6.3 Communications and interactions in innovation platforms, and shifting the balance in market power?

As indicated in the project establishment document as well as reports of the subsequent IP meetings, one main motive of the intervention is improving interaction between various parties surrounding the value chains. This is to enhance the awareness and capacity of farmers on marketing and develop business orientation or commercialization in the long run and thus to improve food security. The interactions among the value chain actors within the platforms are not necessarily based on making direct business activities among themselves. The platforms are rather used as a forum for learning from each other with mainly providing advisory and training services (in addition to the interactions during meetings and beyond) to farmers and rural small-scale traders as well as processors. Such trainings have been offered by specialized urban based traders and processors who are also IP members) as well as professionals from ILRI and other partners. Almost all members of the IPs reported to have received at least one training on marketing, post-harvest management and improved production techniques; in addition to the experience sharing during the meetings.

When asked about what they perceive as the benefit of these platforms, respondents mentioned several reasons. The trainings received on crop and livestock production, as well as the price standardization, the commercialization and use of weighing scales for the products they sell, were considered as beneficial. By the initiative of the platform project,

a livestock trader and butcher (a platform member) from Tamale town has provided training/advise to the farmer members in Tolon-Kumbungu on how best to feed and shelter the small ruminants in order to improve the quality and quantity of meat production. This training is complemented by an introduction of a weighing scale for the products so that the chances of being cheated by buyers (information asymmetry) can be reduced. This is innovative, as small-scale famers in Africa traditionally do not measure the weight of their animals before selling. This also brought a change in crop marketing: during focus group discussions it was reported that products were sold using estimate of the weight of the sacks. This always made the farmers feel being imprecise, on the amount of Maize for example. This, of course, generally opens a room for potential exploitation by the urban traders (not necessarily those in the platforms) or at least creates a chance for negotiation for lower prices by claiming that the product is lower quantity. In other words, the bounded rationality of the farmers coupled with an information asymmetry allows buyers to act opportunistically by manipulating the weight of the products in question. Thus, the relatively better financial consciousness and business orientation of the traders in terms of weighing scale increases their market power. In informal discussions with the community organizers it was found, that traders who buy four to five sacks of the crops using estimates expects that he/she could get an extra 100kg by doing so compared to what could have been if he/she were to buy using accurate measures.

One urban-based processor (a member to eight other value chains groups) from Tamale town also participates in the platform meetings to give advice to the farmers on the benefits of using the price standardization and weighting scales. She mentioned that the platform is *“an eye opener for farmers”* because it has made farmers to start using these weighing scales as well as enquire price information prior to selling their products so that they can compare the prices and sell at a better one. One platform facilitator has also explained how the platform is *“creating additional option for its members to access market information and even get a new trading partner”*. This has the potential of reducing market transaction costs of search and information. Although these farmers may be located at a different village from the traders, they could still consider calling them for market information before selling an output or buying inputs for agricultural production. However, there was also a different perspective from a key respondent on this issue that it could disrupt the customer relationship between farmers and traders outside the platform who have established stable trade partnership. This may seem logical but at the same

time, it can be argued that getting alternative source of market information would help farmers to negotiate for better prices and even make better decisions on timing of sell. Being in the same group or IP could also increase the credibility of the market information they get from the member traders.

The urban-based processor mentioned above, also teaches rural small-scale processors on the best ways to remove impurities from Yam and Rice, and how to process them to higher value crops while buyers get a quality product. When asked about her motivation for the training, she explained that everyone benefits from an overall improved production and marketing concepts among the rural farmers and that there is a multiplier effect for the traders, processors as well as consumers as they get better agricultural products.

In the local markets, the intermediaries are organized in a way that guarantees instant profits by, for example, even blocking the sellers from meeting buyers or vice-versa. They are like brokers/dealers but they deny the ultimate transacting parties the chance to physically meet and begin negotiations. Even when buyer and seller do meet, it has been *de facto* institutionalized that the dealer receives a substantial share of the price from both sides. An explanation for this powerful position of dealers was not given by the farmers and there is some kind of ignorance on the legal rights of the dealing. Farmers mainly blame the government and the legal system for failing to protect them from such misappropriations by actors who have barely contributed to the values of the items in question.

Within the scope of the IP, one of the strategies to reduce these marketing problems has been creating better awareness among the farmers regarding how and when to market their products. One mechanism to achieve this has been improving communication, interaction and cooperation through different means. Such interactions also create an option for the different actors to engage in direct marketing bypassing the intermediaries' in the traditionally unfair markets. However, the middlemen/dealers especially in livestock marketing are so strong and the practice seems to be *de facto* institutionalized that it is not easy to break those unless the government interferes. The platform organizers still believe that bringing the actors together and sustaining the structure through formation of cooperative associations could contribute to a significant improvement of the situation because it allows direct meetings between producers, traders and processors who can make direct transaction activities ignoring the weekly market places or even restructuring the way the transactions should take place. However, as the numbers of

platform participants are small relative to the total population in the two districts, whether such efforts could bring significant overall shifts in the balance of market power in favor of the farmers or if in general the overall development outcome in question is achieved needs to be left unanswered at this point in time.

#### 6.4 Main achievements, challenges and opportunities of the platforms in terms of enhancing interactions and improving market access

The achievement of such forums aimed at enhancing interaction to facilitate actor-oriented solutions to local problems is difficult to measure using the conventional means because most of the achievements are qualitative and not tangible. But based on the facts the members have mentioned during the survey and the essence of the various discussions and the meeting observed at Lawra, it is possible to reflect that the Volta2 IPs in Ghana have so far brought certain benefits for its members. The members reported that participation in the platforms increased interactions and understanding between different actors, enhanced capacity to improve on what actors have, know and are doing and overall an improved productivity and efficiency is reported. During the IP meeting in Lawra, members mentioned that they are now better-off because they can easily get information on market prices and on the availability of inputs (such as fertilizer) and outputs by calling the traders and processors in the platforms. This, they use in addition to the information from weekly radio announcements. Thus, they do not have to go to different markets to make assessments and they do not sell their products without making price comparisons anymore. Contacting new people through the meetings and trainings also opens a chance to establish new trade partnerships among the members. This opportunity did not exist in the past and those activities still seem to be in their infancy. However, as the platform organizer in Tolon-Kumbungu puts it, the platform “*created an additional option*” for value chain actors and reduced the misappropriation of farming products by traders. Farmers can now use weighing scales, make phone calls to traders in the platform and get better market information that results in higher negotiating power or an improved plan in terms of selling time.

Participants in the focus group discussions have also listed and agreed on a number of positive lessons or achievements that they got as a result of their membership in the IPs. These include an improved relationship between farmers in different communities to share knowledge; the possibility of opening a bank account which they were not aware of before; an improved market access with better market information (better connections to

the buyers and improved knowledge on product handling and housing for animals because of the advices from butchers); new knowledge on processing and marketing of products because of the advices obtained from members; and broadening of knowledge about weed control and farming techniques.

However, also several challenges faced by the members as well as the platform organizers have been reported. These include lack of good market opportunities especially for the months after the production; inadequate transport services to convey products to the market; inadequate input supply such as tractors during peak season and a lack of credit options to buy inputs; the prevalence of insects which affect the quality of products and hence disturb the value chain process; low prices of agricultural products and shortage of processing equipment (grinding mill for example) to make value additions to the products and sell at higher prices and inadequate water to process rice. The facilitators also mentioned a shortage of financial means to organize the platforms and to increase the number of members. These challenges might negatively affect the sustainability of the groups. Some also pointed out that some farmers are not able to benefit, as they need to make selling decisions when it is critical rather than when the prices are better.

Although the challenges are still prevalent, the participants believe that the IPs have created many future opportunities to better design strategies and overcome the challenges. Some of the opportunities mentioned include the existence of various stakeholders in the IPs and different market players to share experiences and information, a culture of being organized as a group to share information among the producers; the existence of various communication means because of changing technology and the availability of local materials for constructing warehouses for storage facilities and shelter for livestock. Additionally, the existence of research institutes and other support organizations which give information on agricultural intensification, weed control, better management of land and water resources and product marketing; as well as the cooperation of different value chain actors and other stakeholders to share knowledge on processing and information for better prices have been mentioned. In general, participants have recognized the benefits that the IPs can bring, the challenges they face and the opportunities that exist for IPs to work better. To close the sub-section the quote of a key respondent is mentioned:

*“IP brings different stakeholders together and helps in experience sharing; when these different experiences come together, there is a better chance for gaining new knowledge if it is properly utilized. Some people see farmers as ignorant, but what farmers lack is how*

*to best use their knowledge. So, IP creates an environment where new knowledge and experience of others complement the existing indigenous knowledge of farmers for a better performance.”*

The preceding discussions highlighted that the IPs in the Volta2 project in Ghana have had a positive impact on the level of interactions between various stakeholders and value chain actors. Although the members were not directly involved in serious commercial relationships – farmers, traders and processors participating come from different villages – their interaction and communication through the platforms have contributed to reduce their transaction costs and to improve their access to markets. However, there are also certain challenges hindering the IPs from performing better and achieving the objectives of the project. The following two sub-sections present the factor analysis and the regression results to complement the results of the qualitative analysis.

### 6.5 Factor analysis: results and reliability tests

This section presents the results of the factor analysis both for the conduct and performance indicators. A principal components factor analysis on nine selected statements representing communication and information sharing has yielded three underlying factors (see *Tables 3* and *Table 5*) with Eigen values of greater than one following the Kaiser criteria. These factors have been used as explanatory variables in addition to some socio-economic variables in the market access model. The same procedure on ten statements relating to market access has generated four factors (see *Table 4* and *Table 6*). The decision on the optimal number of factors to be retained has also been checked through the use of scree plots. The three factors in the conduct model jointly explain about 70.73% and the four factors of the performance model account for 70.70% of the total variations in the corresponding variables.

Table 2: Testing for the appropriateness of the factor analysis

Factor analysis	Kaiser-Meyer-Olkin Measure of Sampling Adequacy	Bartlett's test of sphericity		Cronbach's Alpha
		Chi-square	p-value	
Conduct	0.748	142.887*	0.000	0.81
Performance	0.641	93.161*	0.000	0.72
		<i>H0: variables are not intercorrelated</i>		

*NB: \* implies that the test rejects the null hypothesis at the 1% level of significance.*

The two factor models have been tested for the appropriateness of conducting the analysis with the given data and the reliability of the results. The factor model for the conduct variables has an overall KMO measure of 0.748 while the performance factor model has

overall KMO value of 0.641 (see *Table 2*). The results suggest that although both models have KMO value higher than 0.6 (which is widely used and suggested in the literature as a minimum required value to prove sampling adequacy); the factor model for conduct is more robust. As shown in *Table 2*, both models satisfy the conditions of the Bartlett's test of sphericity, as the p-values of the tests are less than the widely used 5% significance level. Cronbach's alpha has been obtained for the two models and the results (*Table 2*) suggest a scale reliability coefficient of 0.81 for the conduct model and 0.72 for the performance model. These values satisfy the greater than or equal to 0.7 alpha value usually suggested by most researchers and software programs for conducting a sensible factor analysis.

In addition to the above measures, the values of communalities have been obtained to evaluate the percentage of each variable's variation that is accounted for by the factor model. Both factor models have communalities of above 0.5 or uniqueness of below 0.5. This implies that at least half of the variations in each variable have been accounted for by the factor model and the rest is unique to the variable. This indicates that most of the attributes of the statements used to explain the conduct and performance elements of the SCP framework have been accounted for and contributed to the final factors. Some statements which were very relevant but have communalities of less than 0.5 or uniqueness values of greater than 0.5 have been removed from the factor analysis and used directly as separate variables in the regression models. *Table 3* summarizes the factor analysis results (based on the values of the rotated factor loadings) for the conduct indicators and indicates the assignment of each statement to the corresponding factor. Similarly, *Table 4* summarizes the results of the factor analysis for the performance indicator.

Table 3: Rotated factor loadings (pattern matrix) and unique variances for conduct

Variable	Factor1	Factor2	Factor3	uniqueness
I am satisfied with the communication frequency I had with value chain actors in recent business relationships			0.5546	0.40
I exchange information with my value chain partners about my on-going activities	0.8826			0.19
My value chain partners exchange information about their on-going activities with me	0.8954			0.18
Exchange of market information has improved in the past 2 years	0.6591		-0.5386	0.22 <sup>a</sup>
I ask relatives and friends in the village for market information			0.8681	0.23
I ask friends and relatives in the city for market information	0.6315			0.40
I listen to weekly radio announcements to get market information		0.8921		0.20
The mode of communication I use with value chain actors is compatible with my living conditions	0.6601			0.35
I am satisfied with the quality of communication I was having with my business partners in the last two years		0.5978		0.45

(blanks represent  $abs(\text{loading}) < 0.5$ )

a. The variable does not show a clear pattern

Table 4: Rotated factor loadings (pattern matrix) and unique variances for performance

Variable	Factor11	Factor12	Factor13	Factor14	uniqueness
Information on the market is easily accessible to value chain actors		0.8217			0.2438
There is a ready market for farm produce during harvesting seasons in my area				0.8242	0.1905
Farmers in the innovation platform negotiate with buyers as a group		0.6317			0.2793
The number of marketing companies buying products from the villagers has increased in the past two years	0.8263				0.2926
I am satisfied by the prices I get from my customers for my products		0.5289	0.6160		0.2681* <sup>b</sup>
Prices for products are mainly determined by intermediaries and my role is limited	-0.5456				0.4291
I sell my output directly to processors or consumers				-0.7620	0.2391
Market access to inputs has improved in the past two years	0.6906				0.3104
My access to output market has improved in the past two years	0.5316				0.4979
I can now better negotiate market prices than two years ago			0.9004		0.1794

(blanks represent  $abs(\text{loading}) < 0.5$ )

b. The variable does not show a clear pattern.

From a matrix of rotated factor loadings, the three conduct related factors representing communication and information sharing and the statements aligned with each of them have been identified. The rotation makes it easier to identify which statements belong to the factors. A 0.5 factor loading is used as a minimum value to determine the allocation of each statement to the factors. The three factor components of the conduct model and four components of the performance model have then been derived by calculating the composite scores estimated for each respondent on the derived factors. The software makes use of the weight of each statement on the factor to be derived.

Table 5: Construction of the underlying factors from individual statements of conduct

Name of factor	Statements contributing to the variances in the respective factors representing communication and information sharing	Remark (assigning name to the factors)
Factor1	I exchange information with my value chain partners about my on-going activities	Information sharing
	My value chain partners exchange information about their on-going activities with me	
Factor2	I listen to weekly radio announcements to get market information	Using relevant media to acquire information
	I am satisfied with the quality of communication I was having with my business partners in the last two years	
Factor3	I am satisfied with the communication frequency I had with value chain actors in recent business relationships	Frequent communication to obtain market information
	I ask relatives and friends in the village for market information	

- Variables (from Table 3) with insignificant contribution ( $< 0.3$ ) to the respective factors have been excluded from the factor construction

Table 6: Construction of underlying factors from individual statements of performance

Name of factor	Statements contributing to the variances in the respective factors representing market access	Remark (assigning name to the factors)
Factor11	The number of marketing companies buying products from the villagers has increased in the past two years	Better access to input and output markets
	Market access to inputs has improved in the past two years	
	My access to output market has improved in the past two years	
Factor12	Information on the market is easily accessible to value chain actors	Better access to market information
	Farmers in the IP negotiate with buyers as a group	
Factor13	I am satisfied by the prices I get from my customers for my products	Improved negotiation for better price
	I can now better negotiate market prices than two years ago	
Factor14	There is a ready market for farm produce during harvesting seasons in my area	Bypassing market intermediaries
	I sell my output directly to processors or consumers	

- Variables (from Table 4) with insignificant contribution ( $< 0.3$ ) to the respective factors have been excluded from the factor construction

## 6.6 Validating the framework and identifying determinants of market access

As explained in section two of this paper, there is well-founded theoretical relationship between the elements of the SCP framework although some empirical findings support the possibility of non-linear and reverse relationships in addition to what the original theory postulates. The qualitative information obtained from platform stakeholders suggests that there could in fact be possible links between certain structural attributes of the IPs such as composition of the platforms and conduct (the degree of interaction and communication) on one hand and between the level of these interactions and communications on members' performance. Improving market access being one of the eight development objectives of the Volta2 IPs, and the variable of interest as a performance measurement in an attempt to validate the conceptual framework through testing the SCP hypothesis, identifying what exactly explains market access got the main emphasis in this study.

It has also been mentioned from the beginning that the IPs involve actors who have something to share with each other to improve knowledge about marketing and hence market access. The existence of other stakeholders such as the organizers who facilitate trainings and meetings and ensure fair decisions will also influence the level of interactions. In fact, none of the platforms has formal regulatory procedures or written guidelines regarding decision-making. In most cases, consensus by all members has been used for making decisions. When it is not possible to reach unanimous consensus, they resort to majority voting<sup>10</sup> after discussions and negotiations on the issues.

On the other hand, the platforms brought actors with unequal power together, particularly in Tolon-Kumbungu. Subsistence farmers and predominantly traders or processors with very small-scale operative capacity engage with large processors and urban traders in the platforms. Although these differences in the economic and social powers of members may not have direct impact on market access because they do not have a respective trade partnership the topics of the discussions and the objectives of the platforms might be designed in favor of the better-offs that usually are the more powerful. Given the larger proportion of farmers and small-scale traders and processors, voting in the decisions could be used as a pretext to claim that the majority wins. However, power can be a tool to twist the topics from the beginning or to manipulate or influence through argument or

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<sup>10</sup> This has been the case, for example, in the Lawra platform during the choice of Maize value chain as the priority upon which members would work on for the coming production calendar.

even bargain with some members to agree to one's ideas. A few people with high social capital who join as many groups as possible including platforms of this type to add to that capital could dominate the discussions and sometimes deny the chance for the less powerful ones of expressing their viewpoints. Although one of such exceptionally powerful persons is a woman, women are rather vulnerable members in the Tolon-Kumbungu IP. The Lawra platform is different from this: women dominated or at least participated equally with men during the whole day meeting witnessed. However, during two focus group discussions organized to identify local wealth indicators and gender roles among other aims, none of the women was willing to contribute to the discussions in Tolon-Kumbungu. Here, the role of socio-cultural factors such as religion, customary laws which restricts women's rights and informally institutionalized gender roles defines their social behavior.

A supporting evidence for this, as also witnessed during the survey, is the completely opposite religious dominance of the two platforms, which has been reflected on the interaction levels of women and the dynamics of the groups in general. Lawra is a Christian dominated area whereas Tolon-Kumbungu is dominated by Islamic society. Women representatives in the latter appeared very shy even during individual interviews in addition to their reservations in the focus group discussions. Therefore, beyond and above the mere gender balance in groups, other factors determine the level of interactions within the platforms. However, whether those who were reserved in meetings and discussions (implying lower levels of communication and interaction) have less market access because of the fewer interactions and communications is difficult to prove. A very important point is whether the difference in the level of overall dynamism of the groups in discussions and women's participation translates into significant differences in actors' performance in actual activities, better market access in this case.

The quantitative result do not seem to support the claim that the Lawra platform could perform better in terms of market access because it is more dynamic, open, has higher participation of women and members have more balanced power. The regression result show a statistically significant difference between the two platforms; Tolon-Kumbungu having better market access, other things kept constant (see *Table 9*). A possible explanation for this is that Lawra is a small remote district (see the *Figure 3* in *section 4.4*) which is very far from market centers while Tolon-Kumbungu is close to several alternative markets including Tamale town, one of the three metropolises in the country.

The nomenclature Tolon-Kumbungu is a joint name for Tolon and Kumbungu, which were administered as a single district but are recently split into two districts while the platform is still known by the joint name. They both have their own market centers with other alternative markets in neighboring districts and villages. Therefore, the natural geographic setup of the two platforms matters in addition to the level of interactions actors can have. Nevertheless, the overall effect of better communication and interaction on market access is positive and statistically significant for the pooled data.

### 6.6.1 Pre-estimation diagnostics

Among the variables used in the regression models, the Shapiro-Wilk W test shows three factors related to communication and information sharing to deviate from normality<sup>11</sup> (Table 7). Graphical inspection of boxplots for all the variables has also confirmed such deviations. Two variables (*incestm2* and *lnnbhous*) which appear to be normal are in fact transformed from *incestm* by replacing two outliers in the original variable with mean values and *nbhous* by its natural logarithm, respectively. It is not reasonable to expect *focq50i* (an ordinal scale variable with skewed responses) to follow normal distribution and transformation is also not viable because the data behavior may change completely. In addition, log transformation of the other variables factor1 and factor2, which came from the factor model, was not possible as they involve negative values.

Table 7: Shapiro-Wilk W test for normality of individual variables for the regression

Variable	W	V	Z	P>Z
age	0.95945	1.695	1.115	0.13239
incestm2	0.95940	1.697	1.118	0.13186
lnnbhous	0.98434	-0.654	0.896	0.81494
focq50i	0.83988	6.693	4.018*	0.00003
Factor1	0.90341	4.037	2.950*	0.00159
Factor2	0.85085	6.234	3.868*	0.00005
Factor3	0.96431	1.492	0.845	0.19894
Factor11	0.97951	0.747	-0.609	0.72883
Factor12	0.95337	1.700	1.110	0.13352
Factor13	0.96692	1.206	0.392	0.34758
factor14	0.99070	0.339	-2.261	0.98812
<i>Ho: variable is normally distributed</i>				

NB: \* implies that the test rejects the null hypothesis at the 1% level of significance.

On the other hand, results from Table 8 show an average value of 1.58 for the variance inflation factor (VIF) for the measure of multicollinearity, which suggests the absence of

<sup>11</sup> Normality of individual variables is in general not a requirement for a regression model to be valid unless it seriously affects the behavior of the residuals. Thus, this test was only conducted to understand the data behavior and find out the potential sources of the problems when the models' residuals are not Gaussian because the study employed OLS.

serious collinearity problem in the set of regressors. Most studies follow a rule of thumb of VIF of less than 5 while some even relax it to up to 10 as decision criteria for a good model. The low VIF values here are also the result of conducting a factor analysis that already reduced correlations between variables.

Table 8: Multicollinearity test for explanatory variables using VIF and Tolerance

Variable	VIF	Tolerance = 1/VIF	Variable	VIF	Tolerance = 1/VIF
IP	2.84	0.352489	lnnbhous	1.24	0.808407
factor1	2.60	0.385266	age	1.22	0.822854
factor2	1.40	0.712389	incestm2	1.21	0.823299
gender	1.32	0.757049	factor3	1.13	0.888709
focq50i	1.29	0.776226	<b>Mean</b>	<b>1.58</b>	

### 6.6.2 Empirical results

The econometric results are generally found to be too complex and difficult to give a clear interpretation of the coefficients. The very reason that the factor analysis suggested four factors to represent market access complicates the entire work. Based on the statements they are constructed from, the predicted factor scores for the four factors are used to represent certain aspects of market access. Four separate regressions have been run using all of the components of performance (turn by turn) as predicted variable and all the three components of conduct as explanatory variables together with other predictor variables. Among the elements of structure and conduct, the four separate regressions have in general revealed that IP (location of platform), gender, natural log of household size, estimated annual income and certain attributes of communication and information sharing (either improved interaction due to the IP in the last two years, or better information sharing, or frequency of communication to obtain market information, or using relevant media) have statistically significant impacts on the level of participants' access to market (either improved access to input and output markets, or better access to market information, or improved negotiation capacity for better price, or ability to bypass market intermediaries) (see *Table 9* and also *Table 5* and *Table 6* for the details).

From the results of the first equation in *Table 9*, it is clear that improvement in access to input and output markets is positively and significantly related to improvements in overall communication/interaction in the last two years during which the member is involved in the IP. When asked if the improvements in communication and interaction with value chain actors has resulted from their membership to the IP, more than 95% have responded 'yes' (see *Appendix 3*). The effects of the mobile technology revolution and of other projects and natural trends in communication in the increasingly converging and

globalizing world cannot be ruled out but for the sake of objectivity the measurement of the respondents themselves was followed although that itself is not objective.

Table 9: Summary of regression results for all the four models of market access

Regression Equation no.	Dependent Variable	Explanatory variables	Coefficient	Beta	T	P> t
1	factor11	focq50i	0.5782 (0.2556)	0.365**	2.26	0.032
2	factor12	factor2	0.3339 (0.1175)	0.359*	2.84	0.009
3	factor13	gender	-0.8305 (0.3816)	-0.418**	-2.18	0.039
4	factor14	IP	1.8330 (0.4026)	0.923*	4.55	0.000
		lnnbhous	-1.0078 (0.4293)	-0.438**	-2.35	0.027
		incestm2	0.0006 (0.0002)	0.449*	3.02	0.006
		factor2	-0.3224 (0.1374)	-0.347**	-2.35	0.027

*NB: - Standard errors (robust) are shown in brackets and betas are standardised coefficients.*

- \* and \*\* represent statistical significance of the standardized beta coefficients at 1% and 5% levels of significance, respectively.
- Only statistically significant variables are reported in all of the four equations (see Appendix 1 for the full regression results).

In the second equation, the conduct element ‘factor2’ is the only variable with significant impact on the corresponding performance variable i.e., ‘factor12’ which is related to access to market information (ability to make trade at better prices). Factor2 refers to following news on price information on radio and satisfaction with the quality of communication with value chain actors. Thus, the result implies that those who listen to various media outlets such as radio in addition to person to person interactions have better access to market information, and this is definitely in line with common sense. The better the level and quality of communication on market prices, the better the level of members’ access to market information and hence to markets.

The third equation is related to improved capacity to negotiate for higher or satisfying level of prices for the products participants buy or sell. From the data evidence, this is significantly influenced by gender differences. The gender dummy has a statistically significant negative coefficient, which implies that men have lower capacity to negotiate for higher prices. This in fact looks strange but it is one of the most important results in the study context. However, it is in line with the information in the data that women are mostly involved in trading and processing activities while men are more occupied by farming activities. Additionally, a very likely reason is that women might have more social connections to get the necessary market information before engaging in transaction activities so that they stand at a better negotiating position. In addition, often the household buying or selling activities are conducted by women even when they are not

traders. Therefore, their better experience in the buying and selling activities for household as well as business matters could make women better to negotiate for higher prices. The result contradicts what the respondents feel about gender in terms of market access. When asked if “male producers have better access to market than women producers”, 67% responded in agreement (see *Appendix 4*). In West Africa, and especially in Ghana, women are known to have an important role in processing and marketing so it does not surprise me that the regression shows that women are better at negotiating prices than men: they are more used to being in the market, unlike in other countries where men dominate marketing. There is lots of literature on the marketing queens of Ghana. Furthermore, having better access to market does not necessarily mean being better at negotiating prices. Market access can be more difficult for women because they are not able to transport their produce alone to market. Alternatively, perhaps it is just a macho attitude: men will not want to tell another man that the women are better than they are.

The fourth equation allows us to examine whether participants are able to sell their products directly to processors and consumers and whether the existence of such ready markets depends on the platform the members belong to. The dummy variable ‘*IP*’, which refers to the location of platform the respondents are part of, shows a statistically significant positive impact on market access. It suggests that those participants in Tolon-Kumbungu IP have better access to markets than those in Lawra, keeping other variables constant. This supports the earlier findings of the existence of better market options in Tolon-Kumbungu compared to Lawra. This is also supported by a proposal document for Volta2 project, which showed that there are limited market options in Lawra district (*CPWF 2010*). Tolon-Kumbungu is surrounded by many market centers including Tamale metropolis with high urban consumer base and big agro-processors. Lawra instead is a small town at about 85 kms from a regional capital (Wa) of the Upper-west region and hence serves as a sole major market center for the surrounding communities. In addition, the level of annual income of the members has been found to have a statistically significant positive impact on the level of access to market. This implies that the higher the level of household wealth, proxied by mean annual income, the more likely that the member has better access to markets.

A very peculiar result in the same equation is that (log) household size, a local indicator of wealth, has a statistically significant negative impact on market access. It implies that IP members with many household members have a lower level of access to markets

compared with those with smaller families. This might be due to the high household consumption with not many leftovers to sell (or struggle to find enough market to buy the required amount of inputs). Larger families might focus on satisfying the consumption needs of their big household whereas families having a manageable number of members could better emphasize on business and hence have better access to markets. The fourth equation also suggested another unexpected result. Those IP members using various media outlets have a lower chance of bypassing intermediaries. A possible explanation is that those who listen to weekly radio announcement communicating ‘credible’ market information organized by the districts’ ministry of food and agriculture offices may not want to waste time and energy to look for processors and final consumers who would likely pay better prices compared to the intermediaries. They may easily give out their products as long as the price offered by the traders does not significantly deviate from what the media has transmitted. This finding can back the new institutional economics explanation: having more information from such as the media can help producers reduce their transaction costs because they no longer need to find other buyers. The information they have allows them to deal directly and negotiate a good price with market intermediaries with radio prices as baseline.

### 6.6.3 Post-estimation diagnostics and validity of regression results

All of the four regressions have been executed with the robust option to correct for any possible bias although some of the equations are found to have constant variances as tested by the Breusch-Pagan/Cook-Weisberg heteroscedasticity test (*Table 10*). This is also chosen because of the small size of the data. The overall specifications of all the models of market access look appropriate as suggested by the Ramsey RESET test (*Table 11*). The Shapiro-Wilk test results indicate that the residuals of equations 2 and 3 are only weakly normal (not normal at the mostly chosen 5% of level of significance while they can be considered normal at the 1% level) (*Table 10*). This caused a caution and necessitated the use of the econometric results only as supplementary to the qualitative information and stories mainly used to test the conceptual framework. However, all the four models were taken as acceptable because the central limit theorem allows us to believe that the results will be normal in large samples as data size is more than the minimum threshold of the rule of thumb of 30 observations. However, it is believed that the small size of observations and weak normality of some of the individual variables, including some statements used in factor analysis, might have affected the results of the econometric model as well as the power of the tests and made the interpretation difficult.

As shown in *Table 11* the R-squares of equations 1 and 3 are very low which reduces the confidence about the overall fit of the model. Although inflated value of R-square may not necessarily imply a better model fit, the results suggest that there might be other important variables that the study did not consider, contrary to the solution from the Ramsey test, which rather approves the specification of the models.

Table 10: Test of equality of variances and residual normality in each of the four equations

Shapiro-Wilk W test for normality					Breusch-Pagan / Cook-Weisberg test		
Variable	W	V	Z	P>Z	Variable	chi2(1)	P>chi2
Resid1	0.957	1.794	1.235	0.108	fitted values of factor11	0.38	0.539
Resid2	0.946	2.256	1.719**	0.042	fitted values of factor12	3.99**	0.045
Resid3	0.941	2.434	1.880**	0.030	fitted values of factor13	1.32	0.249
Resid4	0.964	1.464	0.805	0.210	fitted values of factor14	0.16	0.687
<i>Ho: error term is normally distributed</i>					<i>Ho: dependent variable has constant variance</i>		

NB: - \*\* implies that the test rejects the null hypothesis at the 5% level of significance.

- Resid refers to the residuals of the corresponding regression equations.

Table 11: Ramsey regression equation error specification test (RESET) and other tests of overall fit of the models

Regression Equation no.	Dependent Variable	F-value	Prob>F	R-squared
1	factor11	0.35	0.7920	0.3324
2	factor12	0.54	0.6584	0.5078
3	factor13	0.43	0.7315	0.2792
4	factor14	0.42	0.7396	0.5264
<i>Ho: model has no omitted variables</i>				

Despite the problems of data limitation and issues related to data behavior, the empirical results have revealed some interesting links between the elements of structure and conduct with performance measures particularly related to market access in the two platforms. This might be indicative of the possibility of using the new framework for the impact evaluation study of IP projects at least as a supplementary tool. However, the new framework has been applied to only two (on-going) IP projects that have undergone just one single major season of agricultural production and of marketing activities of inputs and outputs in small-scale farming societies. Moreover, the IPs are mainly discussion forums to enhance better interaction, information exchange and aim to contribute to the improvement of livelihoods resilience of its members through better market access among seven other development objectives. The IP members do not necessarily engage in direct trade partnership with each other in the conventional value chain structure.

Therefore, although the analysis reveals important results regarding the role of IP projects on marketing relationships in this particular case, it is not reasonable to judge the projects based only on achievements in terms of market access. In addition, the sustainability of the platforms is to be seen over time, which needs to be evaluated properly after a respective time frame. It is not clear at this point if the new framework could also accommodate evaluating other impacts such as environmental, social, and the overall project sustainability. Once the intervention project is over by December 2013, and the funding for organizing the meetings and trainings are terminated, there is no guarantee as to whether the group will stay together. There could be specific benefits for members of being in the group but the cost of organizing the meetings might be high compared to the benefits reaped and in light of the capacity of its members to cover it. The incentive of staying together seems significant especially for the farmers but it may not translate into self-financing of the meeting and training costs.

The empirical results generally happened to be difficult to interpret, as the factor analysis did not generate easily identifiable factors to represent market access. However, the regression outputs support the claim that performance depends on structure and conduct regardless of the difficulty faced in making clear interpretation. The bottom line of this whole analysis is that market access depends on gender differences, structure or location of the IP, the wealth of the IP member (with complex effects based on differences in proxies), the level of communication, and the existence of alternative marketing options.

The qualitative analysis has shown that the formation of the IP created a chance for the members to improve the level of interaction and marketing relationships. The establishment of the IPs in the two districts has created an additional option of acquiring new knowledge and market information. The meetings and trainings have also created an opportunity for further trade partnership between traders, producers and processors. However, discussions with the IP members also revealed challenges facing members of the IPs. Building on the qualitative information, the quantitative part has revealed interesting results that are backed by the facts provided by the respondents. The quantitative result supports the information in the Volta2 project proposal document that there is limited market access for Lawra IP. Although this is not fundamentally changing, the IP members have reported that market access has improved after the IP formation.

## 7. Summary, Conclusion and Recommendations

The study had the aim of testing a new conceptual framework that adopts the SCP hypothesis augmented with concepts from new institutional economics and marketing relationships. This was conducted by applying the framework to an impact evaluation study of two IP projects for agri-food value chain development in the northern and Upper West regions of Ghana. In doing so, both qualitative and quantitative methods were employed to a data collected from platform members and other stakeholders to investigate the impact of the platforms in enhancing interactions and improving marketing relationships among value chain actors and hence the impact on market access. After constructing the framework based on qualitative information obtained from various respondents and through observations, a semi-logarithmic multiple linear regression was applied to test the relationships between structure, conduct and performance of the platforms and hence assess the impact of the IPs in achieving development objectives.

Basic information on the composition of the platforms (such as age, gender, member economic activities, and wealth level or income) and other socio-economic, socio-cultural and institutional factors are used to represent the structure of the IPs. While conduct is represented by certain Likert-type statements relating to communication and information sharing, market access is used to represent performance. A factor analysis was applied to generate a reduced number of underlying factors (which were later used in the regression) that best represent these sets of elements. However, because of the small number of members from which data was sought, the quantitative analysis was mainly used to supplement the qualitative analysis which was based on data collected through focus group discussions, interviews of key stakeholders and facilitators of the platforms as well as through participant observation of a scheduled quarterly platform meeting.

The two platforms resemble each other in terms of the composition of their members and the development objectives they were established for. Being part of the same intervention project on the Volta river basin by CPWF and its partners, the IPs were set up in the same fashion and for the similar set of objectives, improving market access as one of them. Women represent about 40% in Tolon-Kumbungu and 45% in Lawra showing a fair gender balance in the memberships. Members were included from the ladders of agricultural value chains including input dealers, producers of crop and livestock, traders and processors. Farmers/producers represent the major share of the membership and are at the center of the intervention. There are also important institutional and service providing

organs such as donors and facilitating organizations, district cooperative offices, ministry of food and agriculture, financial institutions, agricultural extension agents, etc.

The IPs made it possible for the members to have alternative sources of information, improve social capital for some as well as improve marketing relationships. There are some socio-cultural differences between the two IPs such as religion which contributes to the level of interaction in the collectives. On the other hand, the two districts are at about 400 kms apart and have some differences such as proximity to alternative market centers. There are in general more alternative market centers with high consumer base for agricultural products for Tolon-Kumbungu IP. Proximity to major trade centers including a regional capital and existence of alternative markets seem to make this IP better in terms of the level of market access even if members' level of interaction is low compared to the Lawra IP. However, in addition to the relatively liberal Christian religion (regarding for example gender roles) and a relatively better literacy of its members (see *Table 1*), Lawra seems to have benefited from cross-border interactions with people from Burkina Faso which somehow compensated the lack of market options.

In general, the structure of the platforms can determine the level of interaction which can affect access to market. Market access of an agent normally depends on his/her level of acquired market information (on prices, trading partners, availability of products and new markets, etc.). Thus, better interactions within the platforms (and with other partners) can reduce market transaction costs which then improve market performance (access). Although the participation and knowledge sharing of members and the overall interactions in meetings is more dynamic in Lawra, the quantitative result did not support this finding in terms of better market access. This could be due to a compensating impact of the proximity to a major market center (and alternative markets) for Tolon-Kumbungu IP members. There could also be a difference in attitude on level of access to market that one may perceive to have. Another possible explanation for this could be that higher participatory and dynamic discussions in meetings of groups may not necessarily guarantee better performance in markets. Those who are less open in discussions may be those who do the best in solving their own matters although synergy resulting from interaction might have benefited the whole group. The main finding of the study is thus performance (market access in this case) is influenced by both structural as well as conduct variables. The analysis did not reveal any plausible evidence of conduct to have been determined by structure as well as performance.

Finally, the study revealed some interesting results regarding the impact of the IPs on the marketing relationships between its members, the relationships between the three elements of the SCP framework as well as the validity of the new framework for impact evaluation of IPs. However, also here, due to the short life of the project and the small number of project participants, it is difficult to come to a strong conclusion on whether the framework employed here is the most appropriate for conducting impact evaluation, and if at all the results so far achieved are significantly associated to the intervention. These limitations might have affected the power of the econometric model. On the other hand, it might be too optimistic to fully associate the reported results to the impact of the project. This suggests the need for further work to refine and test the framework extensively through impact evaluation practices of completed projects or projects with relatively longer life and involving larger number of observations; and also evaluate the overall impact of these IPs including environmental, social, and overall project sustainability. However, given the theoretical support from well-founded theories it is believed that the new framework could be used side by side with other conventional methods of project evaluation to support existing approaches by producing complementary or supplementary results and help judge its suitability.

### Limitations of the study

The main aim at the “Policy, Trade and Value chains program” at ILRI regarding this work was to investigate the impact the IPs had on participants since establishment and simultaneously test the new framework for future use for monitoring and evaluation of agri-food value chains development IP projects. Thus, there was no intention for including non-participants as a control group and undertake a counterfactual analysis. Including a control group might have been helpful to improve the data points for undertaking robust quantitative analysis and also conduct a “with-without” project evaluation. However, the project is barely more than two years and there is not much tangible or visible impact to be directly measured at this point in time. Therefore, the short life span of the project given also the long realization period of agricultural production might have limited the chance to realize any significant changes and associate them with the effects of the IP projects. Given also the small number of project participants, the results of both pre-estimation and post-estimation tests might be misleading as they give robust results only in large samples. Trying to estimate such a model with this larger number of parameters in a situation of a small number of

observations is also challenging. Because of such issues, the model results are used as supportive of the qualitative examination of the possible relationships between the elements of the framework.

More importantly, the ordinal scale data collected through statements of agreement may not accurately reflect the impact of the project on the participants. Measuring attitude is a difficult task in general. This difficulty is exacerbated when the data is collected from groups with low literacy and numeracy levels in a rural setting like the one under research here (see *Table 1*). As *Barnette (2001)* stated and also often the case in social science research, there might be intentional (faking) as well as unintentional (acquiescence) biases in the responses. This may be because of the potential tendency of respondents to provide either socially desirable or self-enhancing responses or to be strategic and provide either positive or negative answers. These situations can make the data skewed and affect normality. There may also be enumerator bias because the data collections at the two sites have been conducted through two different translators because of the language differences of the regions. Isolating the impacts of other factors that might have also contributed to the perceived changes is also difficult and respondents are not expected to fully dissect those factors and associate with the resulting effects of the Volta2 IP project. In general, the empirical results are mainly based on the respondents' attitudes about the changes in their activities and performances since the establishment of the IPs so that any data problem may have a root in those mentioned potential limitations.

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## Appendices

Appendix 1: Full results for the four regression models of market access

Regression Equation	Dependent Variable	Explanatory variables	Coefficient	Beta	t	P> t
<b>1</b>	<b>factor11</b>	IP	0.0638 (0.6171)	0.032	0.10	0.918
		gender	0.2767 (0.3494)	0.139	0.79	0.436
		lnnbhous	-0.0182 (0.5422)	-0.007	-0.03	0.973
		age	-0.0014 (0.0113)	-0.020	-0.13	0.896
		Incestm2	-0.0003 (0.0003)	-0.240	-1.19	0.247
		focq50i	0.5782 (0.2556)	0.365**	2.26	0.032
		factor1	0.1543 (0.2569)	0.156	0.60	0.553
		factor2	-0.0642 (0.2309)	-0.069	-0.28	0.783
		factor3	-0.1543 (0.6197)	-0.157	-0.95	0.349
		constant	-2.1627 (1.4727)	.	-1.47	0.154
		<b>2</b>	<b>factor12</b>	IP	0.6432 (0.4439)	0.324
gender	-0.2612 (0.2966)			-0.131	-0.88	0.387
lnnbhous	0.1248 (0.2426)			0.054	0.51	0.611
age	-0.0122 (0.0127)			-0.169	-0.96	0.344
Incestm2	-0.0001 (0.0002)			-0.026	-0.17	0.867
focq50i	-0.1968 (0.2583)			-0.124	-0.76	0.453
factor1	0.2535 (0.2252)			0.257	1.13	0.271
factor2	0.3339 (0.1175)			0.359*	2.84	0.009
factor3	-0.0460 (0.1427)			-0.047	-0.32	0.749
constant	1.068 (1.3416)			.	0.80	0.433
<b>3</b>	<b>factor13</b>			IP	-0.3810 (0.5536)	-0.192
		gender	-0.8305 (0.3816)	-0.418**	-2.18	0.039
		lnnbhous	0.0440 (0.4225)	-0.418	0.10	0.918
		age	-0.0228 (0.0147)	0.019	-1.55	0.132
		Incestm2	0.0002 (0.0002)	-0.314	0.71	0.486
		focq50i	0.3342 (0.3217)	0.122	1.04	0.308
		factor1	0.3007 (0.2722)	0.305	1.10	0.279
		factor2	0.0222 (0.1625)	0.023	0.14	0.892
		factor3	-0.1405 (0.2229)	-0.143	-0.63	0.534
		constant	0.01651 (1.8646)	.	0.01	0.993
		<b>4</b>	<b>factor14</b>	IP	1.8330 (0.4026)	0.923*
gender	-0.2039 (0.2973)			-0.102	-0.69	0.499
lnnbhous	-1.0078 (0.4293)			-0.438**	-2.35	0.027
age	0.0123 (0.0108)			0.170	1.14	0.265
Incestm2	0.0006 (0.0002)			0.449*	3.02	0.006
focq50i	-0.0157 (0.2285)			-0.009	-0.07	0.946
factor1	-0.1235 (0.1657)			-0.125	-0.75	0.463
factor2	-0.3224 (0.1374)			-0.347**	-2.35	0.027
factor3	-0.0318 (0.1182)			-0.032	-0.27	0.790
constant	0.4784 (1.3244)	.	0.36	0.721		

NB: - Standard errors (robust) are shown in brackets and betas are standardised coefficients.

- \* and \*\* represent statistical significance of the standardized beta coefficients at 1% and 5% levels of significance, respectively.

Appendix 2: Pictures taken during the fieldwork



*IP meeting and training on commercialization and cooperative formation in Lawra district, 27 June 2013*



*Focus group discussion at Digu community, 22 May 2013*



*Focus group discussion in Golinga community, 21 May 2013*



*A typical residence for a household in Golinga, Tolon-Kumbungu district*



*Interview session in Tolon-Kumbungu (Digu)*



*Interview session in Lawra (Naburniye)*



*Representation of the five scale response categories for Likert-type questions*



*Shelter for small ruminants, constructed after a training under the IP project*



*Facing the challenge: On the way back to Tamale from an interview in Tolon-Kumbungu district*

## Appendix 3: Summary of data on communication and information sharing

Statements	strongly disagree	dis-agree	un-decided	agree	strongly agree	response average
<b>Communication &amp; information sharing</b>						
I exchange information with my value chain partners about my on-going activities	2	1	6	16	18	4.09
My value chain partners exchange about their on-going activities with me	2	1	7	18	15	4.00
Exchange of market information has improved in the past 2 years	0	0	4	26	13	4.21
I get knowledge about weighing scales and price standardizations through IP meetings and trainings	6	3	6	8	20	3.77
The information I get is usually relevant to my needs and production calendar	0	0	3	8	31	4.56
I ask relatives and friends in the village for market information	0	0	5	23	15	4.23
I ask friends and relatives in the city for market information	13	2	4	13	11	3.16
I attend periodic meetings of value chain actors to discuss common marketing problems	0	0	1	26	16	4.35
I use mobile phones to call other value chain partners to ask for market information	13	2	5	11	12	3.16
I listen to weekly radio announcements to get market information	1	2	2	17	21	4.28
I go to the market and do market survey (price assessment) to get market information	3	2	0	16	22	4.21
The mode of communication I use with value chain actors is compatible with my living conditions	4	3	4	16	16	3.86
I am satisfied with the communication frequency I had with value chain actors in recent business relationships	0	0	8	20	15	4.16
I am satisfied with the quality of communication I was having with my business partners in the last two years	0	2	5	15	21	4.28
My communication with other value chain actors has improved in the past two years	0	1	0	26	16	4.33
Do you think that is because of your participation in the IP?	Yes				No	
	42				1	
Total number of respondents						43

Source: Computed from raw data

## Appendix 4: Summary of data on market access

Statements	strongly disagree	dis-agree	un-decided	agree	strongly agree	response average
<b>Market access</b>						
Information on the market is easily accessible to value chain actors	1	0	6	23	13	4.09
There is a ready market for farm produce during harvesting seasons in my area	3	5	6	13	16	3.79
There is good road and transport facility to sell my produce to the main market	7	9	3	5	9	3.23
I usually sell my produce at the farm gate	20	5	0	6	12	2.65
Farmers in the IP negotiate with buyers as a group	10	4	9	13	7	3.07
The number of marketing companies buying products from the villagers has increased in the past two years	10	6	7	13	7	3.02
I have easy access to transport to convey my product to the main market center when I need to sell them	7	8	4	15	9	3.26
I am satisfied with the prices I get from my customers for my products	8	6	6	11	12	3.3
Prices for products are mainly determined by intermediaries and my role is limited	8	14	8	4	9	3.19
I sell my output directly to processors or consumers	4	8	5	19	7	3.40
Male producers have better access to market than women producers	10	2	2	14	15	3.51
I am selling my output to the school feeding program/national buffer stock/other marketing companies	22	6	2	9	4	2.24
Market access to inputs has improved in the past two years	0	0	6	17	20	4.33
My access to output market has improved in the past two years	0	1	4	24	14	4.19
I can now better negotiate market prices than two years ago	1	2	3	21	16	4.14
Do you think that improvements in market access (if any) are because of your participation in the IP?	Yes			No		
	41			2		
Total number of respondents						43

Source: Computed from raw data

Appendix 5: Focus group discussion guide

Introduction/Guide lines

- ❖ Welcoming the participants and have one of them open with a word of prayer or whatever is appropriate in the community
- ❖ Facilitator introduce himself and the team and have participants introduce themselves (also indicating which group they represent)
- ❖ Setting the scene: introduce the organizations involved, innovation platform and the V2 project, highlighting the objectives and the important role of the participants in meeting the objectives
- ❖ Taking participants through the planned process of the focus group discussion
- ❖ Asking for consent to use cameras or tape recorders (if any)
- ❖ Setting the ground rules together with the participants (assigning time for each speaker and focusing on the main/relevant issues for the study)

Main points of the focus group discussion

1. Why and how people became IP members in this district? Who initiated the idea and organized it at the beginning?
2. Where are the markets for crop and livestock products? Both input and output markets. How far are they from the village? What are the main means of transport?
3. Is it common in this area for women to own land and also become household head? If yes, are there gender based differences in access to or ownership of resources (such as livestock and land)? If so, why do you think are the reasons?
4. What are the local indicators of wealth in this district? How are they related to participation in livestock production and crop farming?
5. What distinguishable wealth groups exist in the village? Who is poor and who is rich? Can we identify wealth group based on a rank from 1 (the poorest) to 5 (the richest)?
6. In which wealth group are female headed households usually lie? Why is it so?
7. What are the main value chains in this village/community? Who are the main actors?
8. What are the main challenges and opportunities of the value chains you mentioned?
9. What strategies do you suggest to improve the workings of the value chain innovation platforms?
10. What other supports are available to the community (e.g. government programs, active NGO, research organizations, assistance project, and local self-help group)? Describe
11. Apart from the IP, are you also part of other organizations? If yes, which ones?
12. Would you be ready to be part of other forms of organization? If yes, explain why.
13. More generally, please discuss amongst you three positive and three negative lessons that you have learned from your involvement with innovation platforms.

Focus on market access, communication and information sharing

14. How do people communicate to share information regarding market prices? What modes of communication are common in this area? How frequently do people in the IP share information? Do IP members also communicate and share market information with non-members?
15. Did access to market improve in the past two years? How do you explain this improvement?

## Appendix 6: Interview guide for key informants

## Objective of survey

I am a student research fellow working with International Livestock Research Institute (ILRI) and Counsel for Scientific and Industrial Research - Animal Research Institute (CSIR-ARI). We are doing a study to understand how the involvement in the innovation platform has changed the practices of members. I would like to ask you some questions about the innovation platform and the way it is organized and facilitated.

## Informed consent

I want to make sure that you understand that all the information you give me will be kept anonymous. The information you will give me will not be associated to your name in any of our work or in our further interviews with other people working in this community. If you want to know more about this research or if you have any comments or complaints, you may call Dr. Karbo (Mobile: 0302912178) or Dr. Avornyo (Mobile: 0242179596) at CSIR-ARI. If you want, we will inform you of the results of this study through a seminar.

## Respondent personal information

1. District name: .....	2. Name of community: .....
3. Respondent name .....	4. Phone no.: .....
5. Gender: M..... F.....	6. Age: .....

## 7. Marital status

1. Single	2. Married	3. Divorced	4. Widow	5. Other
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8. Main occupation: ..... Secondary occupation.....

9. Years of experience in the area: .....

10. Role in the district/community: .....

11. Highest level of education completed

1. Never attended school	2. Completed 4 <sup>th</sup> grade	3. Completed 8 <sup>th</sup> grade
4. Completed high school	5. Certificate/diploma	6. First degree and above

## Socio-economic information

12. What is the main sector you work in? .....

13. How often have you attended IP meetings?

1. Never attended any meeting	2. Not so frequently attend the meetings
3. Often attend the meetings	4. Never missed any meeting

14. What is your special role within the IP?

1. Chairperson/secretary	2. Just member	3. Facilitator/organizer
4. Support organization	5. Not even a member	6. Other

15. What activity or activities do you undertake within the value chain or IP?

1. Input supplier	5. Consumer	9. GO (government organization)
2. Producer	6. Research institute	10. Other, please mention ..... .....
3. Middleman	7. NGO (Funding agency)	
4. Processor	8. Financial organization	

16. What does an IP mean to you? .....
17. Do you think IPs are helpful to the community? Yes..... No.....
18. If so, in what ways? .....

Opportunities, challenges and constraints for market access development

19. What are the main challenges in the Volta2 IP value chains? .....
20. What opportunities are there for improving market access for the value chain actors? ...
21. How do you think the problems could be solved given these opportunities? .....
22. What strategies would you suggest to solve the challenges you have mentioned? .....

On the success of the innovation platform project

23. Are the Volta2 IPs in Tolon-Kumbungu/Lawra successful?  
Yes..... No ..... Don't know .....
24. What successes can be mentioned in the cases you know? .....
25. Do you also work with other social organizations or groups other than IP?  
Yes..... No.....
26. If yes, what differences did you observe in the workings of IPs and other groups? .....
27. Do you agree that IPs are at all important?  
1) strongly disagree 2) disagree 3) undecided 4) agree 5) strongly agree

Focus on market access, communication and information sharing

28. Do farmers get market information such as price, type of product in demand, quantity demanded, number of buyers, etc.? Yes..... No..... Don't know .....
29. If yes, who is the major source of market information?  
.....
30. Is this source of information adequate/useful? Yes..... No..... Don't know...
31. Does this source of information differ between women and men? Yes..... No.....
32. If so, what do you think are the reasons? .....
33. Do you think that access to market has improved for participants in these value chains?  
Yes..... No ..... Don't know .....
34. If yes, what do you think are the reasons? .....
35. To what extent do you agree that change in market access is strongly linked to the formation of the Volta2 IPs in these communities?  
1) strongly disagree 2) disagree 3) undecided 4) agree 5) strongly agree 6) NA
36. To what extent do you agree that improvement in market access is strongly linked to the improved communication between actors the Volta2 IP has made it possible?  
1) strongly disagree 2) disagree 3) undecided 4) agree 5) strongly agree 6) NA
37. Would you like to give us any comment regarding how the Volta2 IP project can better be used to attain the development objectives they have been established for? .....
38. Language the interview was conducted in

1. Language of the questionnaire	2. Local language
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## Appendix 7: Questionnaire for IP organisers/facilitators

## Objective of survey

I am a student research fellow working with International Livestock Research Institute (ILRI) and Counsel for Scientific and Industrial Research - Animal Research Institute (CSIR-ARI). We are doing a study to understand how the involvement in the innovation platform has changed the practices of members. I would like to ask you some questions about the innovation platform and the way it is organized and facilitated.

## Informed consent

I want to make sure that you understand that all the information you give me will be kept anonymous. The information you will give me will not be associated to your name in any of our work or in our further interviews with other people working in this community. If you want to know more about this research or if you have any comments or complaints, you may call Dr. Karbo (Mobile: 0302912178) or Dr. Avorny (Mobile: 0242179596) at CSIR-ARI. If you want, we will inform you of the results of this study through a seminar.

## Respondent personal information

1. District name: .....	2. Name of community .....
3. Respondent name .....	4. Phone no. ....
5. Gender M..... F.....	6. Age: .....

## 7. Marital status

1. Single	2. Married	3. Divorced	4. Widow	5. Other
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8. Main occupation ..... Secondary occupation .....

9. Years of experience in the region .....

10. Role in the district/community .....

11. Highest level of education completed

1. Never attended school	2. Completed 4 <sup>th</sup> grade	3. Completed 8 <sup>th</sup> grade
4. Completed high school	5. Certificate/diploma	6. First degree and above

## Information about the IPs

12. Have you been working with IPs in the last two years? Yes ..... No .....

13. What is/was your role in the IPs?

1. Chairperson/secretary	2. Just member	3. Facilitator/organizer
4. Support organization	5. Non-member	

14. How many Volta2 IPs are there in this district? .....

15. What kinds of value chains are they organized on? .....

16. What are the criteria for joining the IPs in this district?

1. Wealth	2. Gender	3. Interest	4. Type of activity
5. Ethnicity	6. Age	7. Other .....	

17. What are the current numbers of members of the Volta2 IPs in the district? .....

a. Does this differ from the numbers at the establishments of the IPs? Yes..... No....

b. If yes, why does this difference occur? .....

- c. How many of these numbers are women? .....
20. How do IP members usually interact to share information? .....
21. What is the most common mode of decision making within the IP?

1. Simple 50% majority vote	2. Consensus among all members
3. 2/3 majority vote	4. Members follow the advice of the IP facilitator
5. Members follow the decision of their leader, elder or representative	6. Consensus among different types of stakeholders represented in the IP
7. Other, please specify:.....	

22. What is the second most common mode of decision making within the IP?

1. Simple 50% majority vote	2. 2/3 majority vote
3. Members follow the decision of their leader, elder or representative	4. Members follow the advice of the IP facilitator
5. Consensus among all members	6. Other, please specify:.....
7. Consensus among different types of stakeholders represented in the IP	8. No other mode of decision making

23. Do IP Members gather in smaller separate groups or committees to focus on specific issues before reporting to the other IP members for decision making?

Yes..... No..... Don't know.....

24. What are the sources of funding available to allow the IP to function (several answers possible)?

1. Member registration fees	2. Tax or levee on sales of members
3. Other voluntary financial contributions from members	4. Grant from NGO or international development project
5. Grant from government or public body	6. Other, please specify:.....

25. What is the most important source of funding to allow the IP to function?

1. Member registration fees	2. Tax or levee on sales of members
3. Other voluntary financial contributions from members	4. Grant from NGO or international development project
5. Grant from government or public body	6. Other, please specify:.....

26. Does the IP pay any staff to help manage it? Yes..... No.....

27. If yes, how many staff are receiving a salary from the IP? .....

28. Is there a regulatory framework recognizing multi-stakeholder associations like IPs in your country? Yes..... No..... Don't know.....

29. Does the IP you are facilitating have explicit rules, regulations or by-laws to govern it? Yes..... No..... Don't know.....

Support facilities provided to the IPs

30. In the last two years, how many times did you provide advice/training to IP members or participated in IP meetings? .....

31. What subjects were the advices/trainings on? .....

32. How was the advice/training delivered (e.g. during IP meetings, direct visit, training course)? .....

## Focus on market access, communication and information sharing

33. Do farmers get market information such as price, type of product in demand, quantity demanded, number of buyers, etc.? Yes..... No..... Don't know .....
34. If yes, who is the major source of market information? .....
35. Do you think this source of information is adequate? Yes.... No.... Don't know.....
36. Does this source of information differ between women and men? Yes..... No.....
37. If so, what do you think are the reasons? .....
38. Do you think that access to market has improved for participants in these value chains?  
Yes..... No ..... Don't know .....
39. If yes, what do you think are the reasons? .....
40. To what extent do you agree that change in market access is strongly linked to the Volta2 IPs in these communities?  
1) strongly disagree 2) disagree 3) undecided 4) agree 5) strongly agree
41. To what extent do you agree that improvement in market access is strongly linked to the improved communication between actors the Volta2 IP has made it possible?  
1) strongly disagree 2) disagree 3) undecided 4) agree 5) strongly agree
42. Would you like to give us any comment regarding how the Volta2 IP can better be used to attain the development objectives they have been established for? .....
43. Language the interview was conducted in

1. Language of the questionnaire	2. Local language
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## Appendix 8: Questionnaire for IP members

## Objective of survey

I am a student research fellow working with International Livestock Research Institute (ILRI) and Counsel for Scientific and Industrial Research - Animal Research Institute (CSIR-ARI). We are doing a study to understand how the involvement in the innovation platform has changed the practices of members. I would like to ask you some questions about the innovation platform and the way it is organized and facilitated.

## Informed consent

I want to make sure that you understand that all the information you give me will be kept anonymous. The information you will give me will not be associated to your name in any of our work or in our further interviews with other people working in this community. If you want to know more about this research or if you have any comments or complaints, you may call Dr. Karbo (Mobile: 0302912178) or Dr. Avorny (Mobile: 0242179596) at CSIR-ARI. If you want, we will inform you of the results of this study through a seminar.

## Questions on respondent background information

1. Sheet number: .....	2. Community id: .....
3. Survey date: .....	4. District name: .....
5. Respondent name .....	6. Telephone number: .....
7. Gender M..... F.....	8. Age .....

## 9. Marital status (encircle the correct response number)

1. Single	2. Married	3. Divorced	4. Widow	5. Other
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10. Number of persons in the household: .....

11. Date of entry to IP, if a member .....

12. Highest level of education of *respondent* (encircle the correct response number)

1. Never attended school	2. Completed 4 <sup>th</sup> grade	3. Completed 8 <sup>th</sup> grade
4. Completed high school	5. Certificate/diploma	6. First degree and above

13. Highest level of education completed by *household head*

1. Never attended school	2. Completed 4 <sup>th</sup> grade	3. Completed 8 <sup>th</sup> grade
4. Completed high school	5. Certificate/diploma	6. First degree and above

14. Number of children in the household.....

15. Number of household members who attended at least primary school .....

16. Number of school aged children not attending primary school .....

17. How many persons do you have financial responsibility over? .....

18. What is the surface of land you are currently cropping? ..... unit.....

19. How many cattle heads do you possess?.....

20. How many donkeys do you possess?.....

21. How many goat heads do you possess?.....

22. How many sheep heads do you possess?.....

23. How many poultry heads do you possess?.....

24. How many granaries do you possess? .....

## Questions on the indicators of Conduct

## 25. Information sharing

<i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>	1	2	3	4	5	N/A
a. I get knowledge about weighing scales and price standardizations in the innovation platform meetings and trainings						
b. The information I get about the market is correct/useful						
c. Extension agents usually provide information that is relevant to my needs and production calendar						

## 26. Trust

<i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>	1	2	3	4	5	N/A
a. The trust in my supplier/customer has been strong in recent value chain business relationships						
b. It is easy to trace back the origin of the products being distributed along the value chain						
c. I have greater trust in my supplier/customer if they are also part of a group I am part of (family, tribe, ethnic group, religious faith, IP)						

## 27. Coordination

<i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>	1	2	3	4	5	N/A
a. I exchange information with my value chain partners about my on-going activities						
b. My value chain partners exchange information about their on-going activities with me						
c. I plan my activities according to the activities of my value chain partners						

## 28. Joint planning

<i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>	1	2	3	4	5	N/A
a. I can express my views freely in exchanges with my value chain partners						
b. My value chain partners and I plan activities together according to our production potential and customer demand						
c. My viewpoints are taken into account by my value chain partners when they plan their activities						

## Questions on socio-economic information of respondent

29. Did the household experience food shortage in the past five years? Yes.... No.....

30. What is the wall of your house made of?

1. Mud/earth/cow dung	2. Wood/bamboo	3. burned mud bricks
4. Cement/bricks	5. Iron sheets	6. Other .....

31. To whom do you usually sell your product (primary output)?

1. IP members	2. Will process it	3. To national buffer stock
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4. Consumers	5. Other traders	6. Other .....
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32. Where have you been selling your products in the past two years?

1. Farm gate	2. Village/local general market	3. Butchery/super market
4. Abattoir/processing	5. Main livestock/crop market	6. Other .....

Questions on the indicators of Performance

33. Access to credit

<i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>	1	2	3	4	5	N/A
a. I can borrow money when I am in need from financial services						
b. I have been able to obtain credit in the area more easily in the past two years						

34. Information access and exchange

<i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>	1	2	3	4	5	N/A
a. Exchange of market information has improved in the past 2 years						
b. Information on the market is easily accessible to value chain actors						

35. Access to inputs

<i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>	1	2	3	4	5	N/A
a. I have easy access to crop and animal husbandry inputs						
b. The prices I pay for crop and animal husbandry inputs are good value						

36. Increased crop and livestock production

<i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>	1	2	3	4	5	N/A
a. My meat/milk production per animal is increasing						
b. My crop production per surface unit is increasing						

37. Increased soil and water management

<i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>	1	2	3	4	5	N/A
a. More efforts are needed for improved soil and water management and supply						
b. Some tension exist between breeders and crop producers for water and land use						

38. Capacity building among value chain actors

<i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>	1	2	3	4	5	N/A
a. My knowledge about my activity has improved in the past 2 years						
b. Apart from the IP, I also participate in other group organizations to learn about innovations						

39. Coordination of activities among value chain actors

<i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>	1	2	3	4	5	N/A
--	---	---	---	---	---	-----

a. I am dependent of my value chain partners to plan my activities							
b. I concert with my value chain partners to take concerted decisions							

Questions on the respondent's activities within the VC-IP

40. Type of activity within the IP

1	Input supplier	5	Consumer	9	Financial organization
2	Producer	6	Research institute	10	GO (government organization)
3	Middleman	7	NGO	11	Other, .....
4	processor	8	Funding agency		

41. Participation in IP meetings

1. Never attended any meeting	2. Not so frequently attend the meetings
3. Often attend the meetings	4. Never missed any meeting

42. Where do you get information about the market?

1. IP members	2. Other friends in other places	3. Extension agents
4. The media	5. Other social organizations	6. Other ...

43. Where do you find information about animal or plant health?

1. IP members	2. Other friends in other places	3. Animal health centers
4. The media	5. Other social organizations	6. Other...

44. Have you ever received any training on crop and livestock productions?

Yes..... No..... Not applicable .....

45. Did you get any advice/training on managing and marketing your products?

Yes..... No.....

46. Have you ever shared market information to others? Yes..... No.....

47. If yes, what was the means of communication you usually use?

1. Telephone	2. Mass media	3. Direct contact
4. Internet	5. Meetings	6. Other, .....

48. Communication: focus question for indicator of conduct

<i>With whom does communication take place?</i> <i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>	1	2	3	4	5	N/A
a. I ask relatives and friends in the village for market information						
b. I ask friends and relatives in the city for market information						
<i>Communication channel</i> <i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>						
c. I listen to weekly radio announcements to get market information						
d. I attend periodic meetings of value chain actors to discuss common marketing problems						
e. I use mobile phones to call other value chain partners to ask for market information						
f. I go to the market and do market survey (price assessment) to get market information						

g. I use telephone landlines to call other value chain partners to ask for market information						
h. I use the internet to get market information						
<i>Communication adequacy/frequency</i> <i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>						
i. The mode of communication I use with value chain actors is compatible with my living conditions						
j. I am satisfied with the communication frequency I had with value chain actors in recent business relationships						
k. I am satisfied with the quality of communication I was having with my business partners in the last two years						
<i>Overall assessment</i> <i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>						
l. My communication with other value chain actors has improved in the past two years						
m. Do you think that is because of your participation in the IP?	Y					N

More socio-economic questions

49. Do you own any one of the following possessions?

HH asset	Quantity	HH asset	Quantity
1. Telephone/mobile		13. Hoes	
2. Radio		14. Sprayer pump	
3. Television		15. Sewing machine	
4. Car/truck		16. Ploughs	
5. Motorbike		17. Spades	
6. Mosquito net		18. Generator	
7. Bike		19. cooking stove/gas	
8. Refrigerator		20. Sofa set	
9. Ventilator		21. Tricycle	
10. Water tanker		22. Bowls for eating food	
11. Computer		23. Cart	
12. Internet		24. Other .....	

50. What is your main/primary activity?

1.livestock keeping	2.crop farming	3.mixed crop and livestock farming
4.trading/merchant	5.processing	6.farm labour on other farm
7.domestic work in own home	8.not working at all	9. other .....

51. What is the main source of income for the household? .....

52. Please estimate your average income per year.....Ghana cedi

For enumerator: (tick appropriate box after converting to USD):

1. Less than 5 000	2. 5 000 to 15 000	3. 15 001 to 25 000
4. 25 001 to 35 000	5. 35 001 to 45 000	6. more than 50 000

53. Improved market access: focus question for indicator of performance

<i>1 = strongly disagree, 2 = disagree, 3 = undecided, 4 = agree, 5 = strongly agree</i>	1	2	3	4	5	N/A
a. There is a ready market for farm produce during harvesting seasons in my area						
b. There is good road and transport facility to sell my produce to the main market						
c. I usually sell my produce at the farm gate						
d. Farmers in the IP negotiate with buyers as a group						
e. The number of marketing companies buying products from the villagers has increased in the past two years						
f. I have easy access to transport to convey my product to the main market center when I need to sell them						
g. I am satisfied by the prices I get from my customers for my products						
h. Prices for products are mainly determined by intermediaries and my role is limited						
i. I sell my output directly to processors or consumers						
j. Male producers have better access to market than women producers						
k. I am selling my output to the school feeding program/national buffer stock/other marketing companies						
l. Market access to inputs has improved in the past two years						
m. My access to output market has improved in the past two years						
n. I can now better negotiate market prices than two years ago						
o. Do you think that improvements in market access (if any) are because of your participation in the IP?	Y					N

54. Would you like to give us any comment regarding how the Volta2 IP can better be used to attain the development objectives they have been established for?.....

55. Language the interview was conducted in

1. Language of the questionnaire	2. Local language
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