

Exploring Agricultural Innovation Processes among Actors in Coffee Farming Sector in Eastern Ethiopia

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The research is financed by Nuffic (the Netherlands organisation for international cooperation in higher education). For detailed information about nuffic, its tasks and activities see www.nuffic.nl

Abstract

Despite decades of research and policy intervention made by different actors, the rate of coffee innovation development was extremely low and poverty remains high among households of coffee producers. Apart from transferring hardware technologies to increase on-farm production and productivity, attention has not been given to factors influencing patterns of actor's interactions and social networks to enhance social learning, communication, participation and negotiation to promote pro-poor innovations. However, recently, it is increasingly being appreciated that what is important for social change is not only knowledge about technology and production, but also institutions and organisations including their (attitude, practices, incentives) for collective learning and innovations, policy environment to avoid institutional and market failure. Exploring the described research problem from adopter and non-adopter sides is a traditional way of looking farming societies taking into consideration different factors which are challenging innovation capacities of farmers, and simultaneously under circumstances in which many actors and networks involved in innovation processes. Thus, is there any alternative way of looking these research problem that provides better picture of factors which drive innovation processes, and also respectful for actors involved in innovation process in coffee sector? Furthermore, if certain behaviour, attitude and practices of the individual, group or community and/or institutions would appear to favour diffusion of innovations, why not create this space? Therefore, the purpose of this study was to explore factors influencing patterns of interactions and social networks among actors, mainly policy and institutional to effectively supporting innovation processes in coffee farming sector in Eastern Ethiopia. Significance was to find out role played by different actors to increase innovation and innovative knowledge. A qualitative case study research approach derived from both conceptual framework, literature review and based on empirical data was utilised. The primary data for this study was obtained through in-depth-interviews with key public and private actors/organisations followed by focus group discussions (FGDs), and participant observations at community level and stakeholder workshop. The qualitative information has been systematically categorized, tabulated and summarized. The results of the study found that different actors have different conflicting views that drive or constrain patterns of interaction and relationships with each other's. Among many factors, lack of shared vision, limited communication gap, lack of incentives for collaboration, lack of resources, lack of leadership and management are the factors that leads to loss of trust relationships. The study also confirmed that despite dynamics of changing of Ethiopian agricultural sector policy and intervention, innovation trends tends to follow linear models of technology dissemination through mainly public actors. In spite of, few policy visions such as commercialisations, decentralisation and newly introduced coffee marketing policy, other policy approach like extension approach are not supportive to ensure actors participation to speed up momentum of coffee innovation processes.

Keywords: Innovation processes, patterns of interactions, social networks, social learning, participation, innovative knowledge

1. Introduction

Coffee plays a crucial role in Ethiopian economy. The country is the centre of origin and diversity of Arabica coffee (Coffee Arabica L.) with different types with unique flavour and taste (Negussie et al, 2007). The crop plays a crucial role in Ethiopian economy and is the most important foreign currency earner generating over 40% of total export earnings, and about 10% of Gross Domestic Product (GDP). It provides livelihood for over 15

million people engaged in production, processing and marketing. The crop is grown in different parts of Ethiopia, though the main production areas are East, South and South western parts (CTA, 2003). However, the potential of the sector has not fully exploited both in terms of productivity and quality. Previous attempts to improve coffee production and productivity did not bring significant impact. According to CSA (2008/09) mentioned by (Temesgen, 2011) the national average productivity is below 665kg/ha, compared with 2100kg/ha of Vietnam and 1007kg/ha of India.

The context of coffee growing farmers in Ethiopia is rapidly changing creating new opportunities and challenges. Among several challenges, improving coordination and collaboration between different public actors at different levels, and between public organisation and private actors (Nuguse et al., 2007, Temesgen, 2011) (i.e. private companies and civil society organisations), shifting priorities and paradigms beyond traditional focus on technological aspects and yields to a more broad emphasis on value chain efficiency, market linkage, institutional innovations, flow of information between researchers, extension agents, investors and farmers (Rahmato et al., 2005; Spielman et al., 2007). Further, government policy has changed in favour of pro-poor, commercialisation of the production system, decentralisation and visualizes an increasing roles of new players (Van der Lee, 2010). Yet, whether these change was improving the well-being of the farmers are not known. What is now required is a more flexible arrangement in which networks of actors and policy organisation are interacting and response to the new circumstances (Hall et al., 2006).

1.1. Role of Agricultural extension services in improving coffee quality in Ethiopia

According to Negussie et al., (2007) the impact of extension on coffee productivity and quality is limited due a number of reasons such as the intervention employed being top-down and using non-participatory approach, where by extension agents are simply delivered, pre-packaged messages to farmers. He further explained that extension training was carried out in the form of formal class room education system with one-way flow of information and extension worker also tended individual contact approach and had limited coverage. Moreover, he elaborate that most of the interventions were production oriented, putting emphasis on transfer of certain technological packages that increase productivity. Besides there has been frequent change of institutional structure, involvement of different actors and intervention approach further jeopardizing the consistency with which the farmers received extension services. According to him, lack of adequate knowledge and skills on production of coffee with enhanced quality and its benefits, inadequate access to coffee processing facilities and other infrastructure, and inadequate differential reward for high quality coffee price at farm gate are constraints contributing to low production of coffee productivity and quality in Ethiopia. In this traditional and linear technology transfer, innovation is perceived as a single product or commodity which is passed to the farmers. However, innovation is something which is different from this traditional approach. According to (Leeuwis, 2004) innovation is a processes of rising awareness of problematic situation, mobilizing interests in networks of stakeholders, new social and technical arrangements (which involves experiential social learning, exploration and negotiation among stakeholders), and co-ordination with in a networks of interrelated actors.

1.2. Coffee production in Eastern Ethiopia and justification for the research

Despite potential topography and climate condition of the area, coffee growing farmers are confronted with different constraints ranging from production, processing and marketing problems. According to (Temesgen, 2011) coffee growing farmers in Hararghe highland has been confronting with different problems like limited knowledge on management practices, drying, storage and handling etc. According to him this cause is attributed due to lack of training, lack of exploring farmer's innovation to document and scale up learning opportunities, lack of motivation and incentives for value adding by extension approach. He further explained lack of investment on the relationships between actors especially- lack of mistrust and transparency in the value chains between the farmers and other marketing actors at different stages. He further explained that top down need setting, poor accesses to information and know how, looking farmers as input supplier rather that partner, information distortion from one actors to another in the marketing of the product makes it more obstacle for value chain operators especially for the pro-poor not to fulfil the quality standard requirements.

In the Eastern part of Ethiopia, diverse public and private actors are involved and mandated for improving the livelihood of coffee farming households with different forms and approaches of coffee intervention goals. These are coffee producers, agriculture and rural development offices, research centres, universities, Ethiopian commodity Exchange (ECX), local traders, processors, brokers and government supportive structures (i.e. finance, credit and saving institutions) and investors. However, improving the production and productivity of coffee sector remains the major challenges poverty remains high among households of coffee producers.

Among many causes of the problems limited patterns of interactions and social networks among actors at different levels that hindered innovation processes thought to have contributed to the prevalence of the problems. Apart from transferring hardware technologies to increase on-farm production and productivity,

attention has not been given to factors influencing patterns of actor's interactions and social networks to enhance social learning, communication, participation and negotiation to promote pro-poor innovations. However, it is increasingly being realised that what is important for social change is not only knowledge about technology and production, but also institutions and organisations including their (attitude, practices, incentives) for collective learning and innovations, and government policy to avoid institutional and market failures. The significance of this research is therefore to explore factors influencing patterns of interaction and social networks, and role of actors to supporting innovation process and increase innovative knowledge among coffee sector.

2. Literature review

2.1. Perspectives on Innovation processes in Agriculture and Rural Development

2.1.1. Innovation

Various literatures provide alternatives, yet complementary, definition of 'innovation' (World bank, 2006; Spielman, 2006; Leeuwis, 2004; Engel, 1997). The insight that can be derived from these literatures include: I) knowledge becomes innovation when it is successfully used for economic and social purposes ii) innovation results from the application of 'new' knowledge, accumulated knowledge or creative use of existing knowledge, iii) innovation can be drastic or incremental continuous changes, iv) innovation is not an event, rather it is a process. It is the outcome of continuous effort and of continuous process of experiential social learning through network building and interactions through multiple and heterogeneous actors. , v) the existence and nature of interactions among actors is shaped by economic and social institutions, VI) usually successful innovations have technical and socio- organization dimensions and vii) innovation could lead to improved productivity, commercialization, and income and welfare gain.

2.1.2. A one -dimensional view of innovations

In adoption and diffusion research, the innovation is often treated as a single entity and assumed as it is originate from agricultural scientists, transferred by communication workers and other intermediaries, and are applied by agricultural practitioners (Leeuwis, 2004) . This mode of thinking is called 'the linear model of innovations' (Kline and Rosenberg 1986 cited by (Leeuwis, 2004) as it draws straight and one directional between science and practice. This notion of innovation is purely technical and did not pay attention to nature, source and dynamics of innovation process that could affect farmer's decision as well as distributional or equity issues related to innovation. This paradigm is criticized for aforementioned drawbacks and failed in particular in developing countries (Roling, 1992; Roling and Engel, 1992; Engel, 1997; Leeuwis, 2004).

2.1.3. A multi-dimensional character of innovations

It has been recognised that innovation is not a linear top down process in which new idea or product is developed by agricultural researchers and moves down technology development and ends with the adoption of farmers and finally farmers are blamed as 'laggard' for his /her decision under dynamic and complex environments. Neither it does not take place in isolation; instead it takes place in interconnected networks of actors. Innovation is not only about technology development but also new institutional and organisational arrangements such as new rules, perceptions, agreements, identities and social relationships (Smits 2002, Leeuwis, 2004). This implies that there are many stakeholders networks involved in innovation process, and hence it is not useful to look at 'adoption' as something which happened at an individual level. Furthermore, in these collective point of view of, innovation is consists of a variety of new and interdependent practices that may be implemented by a variety of actors such as male farmers, female farmers, traders, input supplier, transport companies etc., (Leeuwis, 2004).

2.1.4. Innovation processes

Agriculture is one of the industries where a system approach to innovation has been least applied, for several reasons. Institutional barriers and the 'distance' between research and practice mean that, in many countries, farmers' knowledge has only insufficiently been taken into consideration as a possible source of innovation (Scoones and Thompson, 2009).

Innovation processes are increasingly conceptualised as the outcome of collaborative networks where information is exchanged and learning processes happen. Any innovation produces a change in socio-technical configurations, which are pattern of relations between human and non-human elements (Leeuwis, 2008). A literature review presented by Brunori et al., (2008) reveals that an evolution of innovation studies in agriculture showing the progressive shift from 'linear' and 'exogenous' conception of innovation to 'systemic' and 'endogenous' approach defining innovation as a learning processes.

The current paradigms of innovation conveys the notion of innovation as social networks and socio-technical arrangements that could result from the interaction of different actors who have conflicting interests, different objectives and different degrees of social, economic and political power. Innovations do not only consists of new technical arrangements but also new social and organisational arrangements such as new rules, perceptions, agreements and social relationships in which different stakeholders involved. It is the collective process that involves the contextual re-ordering of relations in a multiple social networks (Leeuwis, 2004, Smits, 2000). The researcher adopted these views of definition for this study.

2.2. Conceptual definitions and theoretical background of social networks and/or networking

A social network is a set of individual or groups connected to one another through socially meaningful relationships (Wellham and Berkowitz, 1988). A social network can consist of groups and sub-groups of actors. Before specific characteristics of social networks can be explored, or their quality investigated, the network type being studied in any social capital research must be identified (Stone, 2001).

Robert Putnam (1998 as cited in Stone, 2001) distinguishes between informal and formal networks. Among informal networks distinction is first made between families within and beyond the household, as it is anticipated that family units within one household cooperate and function in different ways to extend the networks of kin beyond the household. Informal 'communities of interest' beyond family and kin include friendships and other intimate relationships as well as bond among neighbours. Formal networks of social relations focused aspects of life most often described as civic or institutional (Baum et al., 2000). These include associations with formally constituted groups as well as non-group based activities.

According to Kohler et al., (2007) and Hogset (2005) cited by Desselegn (2008) social network affect the diffusion of innovations through social learning, joint evaluation, social influence, and collective action process. Through social learning, people learn about an innovation's existence and characteristics and take advantage of alters experience to lower uncertainties related to adoption.

Agapitova (2005) as cited by Desselgn (2008) argues that social networks might hinder or facilitate innovation adoption and diffusion. He argued that social networks can accelerate technological change by supporting trust, cooperation, circulation and dissemination of new knowledge, process of reciprocal innovation that reduces the distinctions between large and small firms. On the other ways, social networks can hinder innovation by creating barriers to new entrants and thereby limiting opportunities to experiment with new technology.

(Leeuwis, 2004) argued as the importance of networks as key role in contributing innovation can be equalled to establishing novel, effective relationships between multiple human and non-human entities (I.e. the practical activities of 'networking' in innovation, knowledge systems and communicative intervention). On other words, he explained innovation as about network building and/or networking and /or re-configuring existing networks, social learning, participation and negotiations. According to him communication plays central role. These processes are also reviewed based on literature as follows.

According to Engel (1995) networking and/or network building is the methods achieved due to the conscious effort of certain social actor's interactions to size and bond affiliation in order to enhance sustainable development Network represents 'communities of ideas', a space for like-minded people to interact on the basis of common interests, mutual trust and anticipated concern. He further explained that, not so much the manufacture of products rather it is about exchanging knowledge and insight and sense making are the core business.

3. Research Strategy and Methods

The researcher was decided to adopt 'case study' design for the study justifying the nature of the research topic and the need to get in-depth information (Oliver, 2008). The research strategy was a qualitative exploratory approach developed from the conceptual framework and literature, and based on empirical data. Case study is the methodology that permits the researcher to gain deep insight in complex social setting or social processes in order to have the holistic and meaningful characteristics of the real events (Yin, 1984). Both primary and secondary data sources were used for this study. The secondary data was collected by desk study from various literature (internet search, reading books, publications, journals and videos) and documents (both published and unpublished) on the topic in order to provide theoretical and conceptual framework which was used as an input for the study process. A purposive sampling method was employed for this research because the research was designed to focus on interpretive explanation, and not prediction. Accordingly, Daro Labu district, the potential coffee producing area in the eastern Ethiopia was purposively selected. Then, three potential coffee growing kebeles (Chafe Hara, Sororo and Sakina) were purposively selected.

The primary methods employed for data collection was focus group discussions (FGD), individual-in-depth interviews and personal observations. The field work was conducted during July-September 2013. In the first place, an in-depth interview was carried out with relevant public and private actors/organisations actors at zone and district level. These are: researchers, researcher mangers, extension agents, experts and management level, cooperative and farmer organisation representatives, representatives of coffee market centres, traders and brokers. These respondents were considered from organisational aspects to understand what strategies they put in place to enhance innovation process among coffee farmers. At these sessions, 'snow balling method' was adopted during field work to identify additional actors that might increase the sample size. In this connections, (Bernard, 1995 pp.97), explained snow balling techniques as important tools in studying social networks and interactions where the object is to find out who people know and how they know each other.

In the focus group discussions, a total of 60 coffee growing farmers from aforementioned three kebeles

were participated. The sizes of the group were guided and adjusted in-line with literature evidence. For example (Sherraden, 2001) states the size of FGDs could be between 8 and 12 in order to get good participation of all members equally. The participants were asked to reflect on their activities, practices and their actions in relation to the technical and social dimensions of their coffee production and marketing. The discussion was guided by detailed checklist that was developed and pretested by the researcher in order to ensure that all interviewees clearly understood the questions in the same way.

Complementary data were collected through participant observation of network actor's behaviours and practices. In this method the researcher was become immersed and part of the population being studied in order to develop a detailed understanding of the values, beliefs and judgement held by the actors chosen for the study. Transcript from these sessions supplement data collected through focus group discussion and interviews. In general analysis of knowledge circulation, patterns of interaction and linkage, factors constraining inter-actor collaboration and interaction, social learning and innovations with the participation of relevant actors, and their role, conditions in place to increase innovative knowledge and collective learning was formed core points of data collection. The qualitative data was systematically analysed by describing, grouping, categorizing, summarizing and discussing the findings under different themes. Finally, the findings were interpreted by texts, figures and tables in order to draw conclusions. A draft of this research report was presented to stakeholder meeting for validation. The feedback and comments incorporated from the meeting was facilitated the completion and quality improvement of the final draft report.

4. Findings and Discussion

4.1. Actors and their roles in coffee innovation processes

The relevant actors can be categorized based on their respective roles into enterprise, research, intermediary, demand, policy domain and supportive structures (Arnold and Bell, 2001 cited in Hall et al. 2006). The result indicates that zone and government agricultural offices, public research (Mechara and Jimma Agricultural Research centres), coffee growing farmers, farmers' cooperative union, traders, brokers and supportive structures (i.e. finance, credit and saving institutions) are the major actors directly and indirectly involved in the coffee sector. The study result shows public actors (research and extension organisations) are dominating coffee innovation processes (deliver improved technology, extension and advisory services). These actors are involved mainly in generating technologies transfer to enhance productivity. In contrary to this, (Leeuwis, 2004) explained the roles of actors in multi-dimensional views of innovation processes which conveys the notions of involving a broad range of activities, geared towards, among others creating platforms, improving insight, explicating tacit knowledge, managing conflict, creating productive group dynamics and bringing about co-ordinated action. This is practically lacking in the district among coffee actors. However, recently various studies explicitly acknowledge the importance of the non-public actors for acceleration innovation processes of coffee actors.

Moreover, the respondents were asked the relevance and importance of such information/resources provided by the actors? Accordingly, farmers said 'broker provides inaccurate market information. For instance they said 'due to lack of information at village level, the broker comes to the village and tell us the marketing price during harvest time. Due to benefits they gain from the whole collectors they tell us price which are less than that of standard price.'

The result shows the relevance of the information given by actors in problem solving was less. For instance the respondent said 'bare root coffee seedling distribution project failed due to lack of moisture, black TV screen that displays price information damaged due to lack of ownership and sustainability.'

Table 1: Actors and their roles in coffee innovation processes

Actors	Proposed roles	Limitations and/or missing links
Intermediary domain {Zone and district Agricultural offices, Ethiopian commodity Exchange [ECX], Farmer's Cooperative Union)	<ul style="list-style-type: none"> • Provide training, capacity building and other advisory services for coffee growers • Provide market information related to coffee growers and traders • Provide input (fertilizer, improved technologies) and some other loan to coffee growers 	<ul style="list-style-type: none"> • Its effectiveness limited due to lack of collective learning with relevant actors and farmers.
Research domain (i.e. Mechara and Jimma Agricultural Research centres)	<ul style="list-style-type: none"> • Generate knowledge and improved coffee technologies • Provide training and awareness creation for farmers, extension office and stakeholders • Scaling up of improved coffee varieties. 	<ul style="list-style-type: none"> • Its effectiveness' is limited due to neglect of addressing non-technical arrangements related to institution and market.
Enterprise domain (coffee growers, processors, traders, brokers, cafes)	<ul style="list-style-type: none"> • Coffee growers are more active in sharing information through informal social networks (farmer-to-farmer, kinship, informal associations). • Traders are more active in providing credit, post-harvest handling equipment and social services • Brokers provide price information 	<ul style="list-style-type: none"> • Its effectiveness is limited due to lack of external support (advisory services) to institutionalise as a learning channel
Demand domain (local buyers/collectors processors, traders, brokers, local cafes, and national and international niche market)	<ul style="list-style-type: none"> • Provide price and market information • Provide informal advisory council on quality management for coffee growers • Provide packaging material, some loan in cash or kind for coffee growers • Local traders support public infrastructure (school) in coffee growers farmers village • Give advocacy services for coffee growers on saving and banking system to develop saving behaviours 	<ul style="list-style-type: none"> • Its effectiveness limited due to missing linkage with public research system • Its effectiveness limited due to lack of trust (for example brokers give false price information for coffee growers)
Policy and supportive structures (zonal and local governments, Micro-enterprise offices, credit and saving organisation associations)	<ul style="list-style-type: none"> • Provide credit in kind or cash, indorse local legislation and enforcement 	<ul style="list-style-type: none"> • Their effectiveness is limited by bureaucratic procedures

Source: author

Compression of the above table under current paradigm of agricultural innovation system with linear model of innovation;

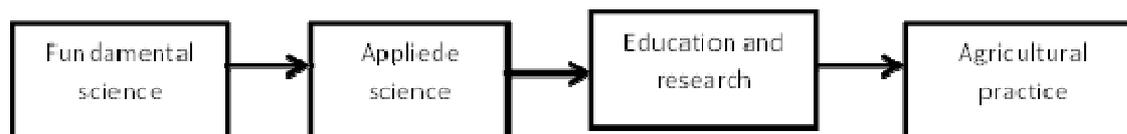


Figure 1: linear model of innovation, adopted from (Leeuwis, 2004)

4.2. Patterns of interactions and relationships

FGDs and interviews with respondents were used to understand patterns of interactions among actors, habits, practices and incentives influencing nature of interactive relationships.

Except district agricultural office and coffee growers, no two ways of interactions and linkages with public research have been observed for knowledge sharing and learning in the district. District agricultural office has interaction with Ethiopian Commodity Exchange (ECX) for marketing information services. Both research centres (Mechara and Jimma Agricultural research Centres) have moderate interaction and collaboration for knowledge sharing, innovation development and resource base. Their effectiveness to form multi-stakeholder platform for joint experiential learning and innovation was constrained by various institutional and structural related factors.

According to information of the respondents there are no functional and meaningful social learning exist among actors as the kind of linkage and interaction in supporting innovation process and knowledge circulation involves one-way information transfer methods. In general, different actors have different conflicting views that drive or constrain interaction with each other's. For example, lack of shared vision, limited communication gap, lack of incentives for collaboration, lack of resources, lack of leadership and management are the factors that leads to eradications of trust relationships and finally hinder interaction of actors in the study area.

The findings pointed out that though contribution towards learning is limited both formal and informal ways of interactions are observed among actors. Moreover, absence of enabling environment like access to ICT and financing organisation and weak coordinating bodies negatively impacts the interactions and partnerships among actors. For example: lack of incentives for collaboration and absence of data base and networking hindered speed of communication flow among actors in the study area.

According to the innovation perspectives diverse, more dense two way communications of actors are useful to enhance and speed up innovation successes. From reflections of empirical findings this fact was absent in the study area. In these connections, various literature evidences from Ethiopian land scape confirms this findings. Sipleman et al., (2007) suggests that in spite of government policies on science, innovation, technology, and private sectors investment, there are little incentives to stimulate collaboration and coordination between key actors and other players. This is due to limited capacities at all levels (national, regional and local) to make collaboration practical.

4.2.1. Attitude, practices and incentives influencing interactive relationships

Supportive attitude, practices and incentives: According to the discussion of the FGDs, the respondents agreed experience sharing programs among farmers, recognition and rewarding of model farmers are contributing to the development of the innovations. Leaders, managers and experts at the district level indicated that policy programs such as proclamation of coffee marketing policy, rewarding of model farmers are contributed to the development of the innovations. On the other hand, coffee traders pointed out that establishment of coffee market centre at the district level as the path way for the improvement of the sub-sector. The respondent also indicated that policy programs such as commercialisation and decentralisation are contributed to the development of the innovations of the sector. Delegation and decentralisation of responsibility and power, at regional and local levels, and market information exchange through ICT on the daily basis between extension office at district level and coffee traders and role of ECX through market information builds some confidence and trust among actors.

Restrictive attitude, practices and incentives: Expert explained assignment of extra duties like political agenda for development practitioners as it is restrictive to innovation and learning. According to the farmers, lack of identifying the needs, priorities and problems of the communities bottlenecks the rate of innovation generation and circulation. In this connections (Engel, 1997) confirmed that stakeholders and demand side are important priorities and signals that shape the focus and directions of innovation processes. He suggests innovation system concepts acknowledges the importance of the inclusion of stakeholders, actors and the development of organisational behavioural patterns and polices that sensitive to demand side agendas.

According to district experts, many approaches that have been practiced are top-down. They explained that, few years ago technologies are developed and generated in different agro –ecologies were distributed for farmers and finally the technologies are failed. Besides, district respondents were confirmed that though the full participation of the farmers is not well recognised, recently public researches are considering impacts of agro-ecologies. Respondents of FGDs pointed dissemination of technologies without target farmers need is restrictive

practice that affect adoption as well as farmers trust for collaborations with extension organisation and learning. In this line, one farmer from FGD said that;

‘Two years back I received bare root coffee seedling. But under moisture stress areas we live in here, raising bare root seedling is very hard.

According to the respondents, fearing to take risks, absence of insurance for exporting coffee on the seas, absence of national coffee insurance/subsides are major attitude and practices affecting innovation development. In this connections, (Mytelka and Farinelli, 2003) indicates that one way of mechanisms to be more successful for innovations under dynamic environment and uncertainties is to take risks in order to cope with changing circumstances by building self confidence and trust through fostering and reconfiguring linkages and networks with partners and actors. This helps to stimulate creativity that speed up innovations.

Table 2: Key characteristics of attitudes and practices affecting innovation processes among actors in the district

Innovation process , knowledge exchange and relationships	Restrictive attitude and practices	Supporting attitude and practices
Interaction, knowledge flows and learning	<ul style="list-style-type: none"> • Absence of functional learning council/forum among actors • Hierarchies of the organisation or organisation is not learning organisation • Mistrust each other • Lack of incentives • Bureaucratic behaviour of the organisation • Shortage of skilled man power • Lack of database and networking and communication among actors • Inadequate demonstration and training service • Absence of feedback learning mechanisms 	<ul style="list-style-type: none"> • Experience sharing and learning event • Incentives and reward of model farmers • Incentives and reward of researchers and extension agents for achievement • Majority of farmers interest to learn new innovations • Some informal network among farmers
Inclusiveness of the demand side	<ul style="list-style-type: none"> • Absence of joint planning, learning and implementations with farmers • In practice researchers are not ready to change their mind/outdated professionalism (repeating top-down research model, not trust farmers/traditional knowledge • Little farmers participation during need assessment • Shortage of coffee infrastructure 	<ul style="list-style-type: none"> • Government decentralisation (regional research centre I,e agro-ecology based technology generations) • Commercialisation (government are promoting high value crops like coffee) • Improvement of coffee marketing proclamation (ECX)
Risk taking	<ul style="list-style-type: none"> • Organisations fearing to take risks • Absence of insurance for exporting coffee on the seas • Absence of national coffee insurance and subsidies for farmers and traders 	<ul style="list-style-type: none"> • Delegation of responsibility and power at regional and local levels

Source: author

4.3. Social networks and /or networking among actors in the process of coffee innovation development

To understand the existence of functional formal and informal networks that are relevant to facilitate innovation process and knowledge circulation focus group discussions were held with farmers, development agents and experts. Accordingly, the finding results showed that formal networks include, zone and district agriculture offices, Jimma and Mechara research centre, Development agents and farmers, farmers cooperatives unions. The major roles of these networks are provision of production knowledge and/or information and input delivery

services like training on coffee agronomy, fertilizer application (compost for coffee), quality management and credit distributions.

- Zone and district agriculture offices are more active in training of coffee agronomy and seedling distribution.
- Mechara and Jimma research centre is more dominating in technology generation and training intervention.
- Development agents are active in information transfer and knowledge brokering at village level.
- Farmers are more involved in sharing of knowledge among them. For example: indigenous knowledge exchange.
- Jimma research centre are more facilitating collaborative activities through finance, infrastructure, resource base and capacity building
- Farmers' cooperative unions are more facilitating credit, post-harvest handling facilities and market information.
- Universities are more active in identifying problems and opportunities through advising graduate research students.

According to the FGD discussion with the farmers: the drawbacks of these formal networks are: lack of demand driven input/technology distribution. According to the results, the effectiveness of the formal networks are limited due to lack of room to create experiential social learning and unable to give due attention to scale up farmers innovations in wider communities which is likely due to lack of resources.

During discussions with the farmers group, 3 out of 15 respondents of the farmers knew the different techniques and practices some of their neighbour farmers are using for coffee growing. These farmers learn the techniques through personal contact and visiting the nearby farmers. The other 12 farmers not knew the different techniques and practice their neighbour farmers are using for coffee growing. These informal social networks are farmer to farmer, farmer to trader and trader to broker. The major roles of these networks are mainly for exchanging knowledge and to facilitate and exchange market information and credit services. According to FGDs results relatives, kinship and neighbourhood relations are the informal means of social networks building and information dissemination among farmers.

As we discussed in the above, findings indicate that apart from weak linkage for information transfer in both formal and formal social networks there is no active interactions and relations within and between each networks. There is no functional body coordinating these networks to be functional and effective. As a result there is no social learning happened among the actors. In this regard, Leeuwis (2004) argues that innovation is not only creating new ideas or knowledge rather it is about re-ordering of multiple social networks by professional engaged in rural innovations which are supporting knowledge circulations among actors.

4.4. Policy and enabling environment supporting actors' innovation processes

This topic was directed by agricultural innovation capacity guidelines (Hall et al., 2006). According to these guidelines the wider policy support and enabling environments can be explored through interviews with key informants. Accordingly, different respondents were interviewed in order to explore the enabling environment for acceleration of coffee innovation processes.

The overall results showed that national policy reform such as commercialisation, decentralisation, information/ strategies of ECX (improvement of coffee marketing and information access), are creating spaces that enable innovations. For instance the respondent indicate proclamation of 2008 on coffee quality control and marketing which endorses and prohibits the export of low quality and ungraded coffee. Moreover, the exemplary result of empirical finding indicate as licence was issued to trade coffee within the country and/or for export and trade in coffee in general including store, transport, dry and wet process, and cleaned and grading coffee) as rapidly creating space that enable innovations.

On the other hand, the respondents confirmed that top down Ethiopian extension service approach, heavy tax policies on coffee traders, world trade problems on coffee, inappropriate land use policy system, lack of a local and national coffee learning forum, lack of incentives for stakeholders collaboration, absence of proclamation on access to and benefit of sharing genetic resource and indigenous knowledge, lack of strong National Agricultural Research System (NARS) for breeding program have profound impact on the innovation development of coffee farming sector. For example: Ethiopian extension approach is criticised for being top-down (class type learning style), lack of incentives to subsidizing coffee growing farmers, limited capacity of input and credit supply systems, lack of improved quality farm tools and equipment's and follow-up problem. Results indicate that, apart from supply driven technology transfer, the approach does not create spaces for scaling up of farmers knowledge.

5. Conclusions

This study presents an exploration of agricultural innovation processes in coffee farming sector in Eastern Ethiopia. Using concepts derived from conceptual framework and tools adopted by research strategy the study explores factors influencing patterns of interactions and relationship (habits, practices and incentives, policy) among actors and their role to effectively supporting innovation processes in coffee farming sector.

The empirical findings revealed that there are diverse actors engaged in improvement of coffee innovation sector, with public actors playing the dominant roles though constrained by various knowledge and resource base. It also reported the effectiveness of public actors is more constrained due to neglect of institutional arrangement, demand-driven and market linkage. Moreover, the empirical data also confirmed that the contribution non-public actors are mainly remain untapped.

Habits, practices and incentives of the organisation made actors to take new roles and facilitate or hinder innovations and influences nature of interactive relationships. The study pointed out that different actors have different conflicting views that drive or constrain patterns of interaction and relationships with each other's. Among many factors, lack of shared vision, limited communication gap, lack of incentives for collaboration, lack of resources, lack of leadership and management are the factors that leads to loss of trust relationships. For example: the study explored that among different coffee actors, except district agricultural offices and coffee growing farmers, no two ways interactions and linkages with public research have been observed for knowledge sharing and learning. The empirical data captured from the field also shows the missing links that are constraining the competencies of the organisations in problem solving and innovation. Among others, lack of farmers based organisation, weak market linkage, lack of database and networking to assist communication, lack of strong actor collaboration and financial constraint were mentioned.

According to the empirical findings government attention has geared towards achieving more visible innovations through policy focus such as commercialisation, decentralisation, proclamation of coffee quality management and control and public investment in ICT. To some extent, this has become creating new spaces of learning and innovations for actors. Yet, no functional mechanisms are in place for facilitating collective experiential learning and for scaling up of successful experiences to achieve wider impacts. Further, the findings confirmed despite dynamics of changing of Ethiopian agricultural sector policy and intervention, innovation trends tends to follow linear models of technology dissemination through mainly public actors. The existing extension approach is not supportive in favouring innovations as it only involves one ways of information and technology transfer.

The findings revealed that formal social networks plays dominant roles in the provision of production related knowledge, information and resources for coffee farmers. Similarly, other informal social networks like farmers and traders are active in the areas of exchanging indigenous knowledge, coffee quality management, price and marketing information services. This informal network has been constrained by financial base for scaling up local innovation. However, it has been observed that there is no functional body that links these networks within and among them to be more effective.

Finally, some policy environment both at the national (i.e., heavy tax policies on trader, inappropriate land use policy at farmer level, lack of advanced post-harvest quality management infrastructure/coffee washing machine) and price fluctuation were reported as constraining policy environment especially at coffee producers and traders.

6. Recommendation

Based on the analysis of empirical findings and discussions the following key recommendations were made.

- The current Ethiopian policy approach is dominated by linear top-down technology transfer thinking approach. However, innovations do not only consists of new technical arrangements but also new social and organisational arrangements such as new rules, perceptions, agreements and social relationships in which different stakeholders involved. Thus, the policy needs to give additional attention to institutional innovations which take into account knowledge of processes consultancy, facilitation and accommodating resources.
- Currently, public service providers are dominating innovation networks of other actors through administration, financing and other services. In this regard, public extension services and research should revisit their roles and change their focus in order to re-ordering of diverse actors and create spaces for local innovation and social learning. These include: encouraging the entry of new actors in the demand and supply chain of coffee sector like private actors and Community based organisations (CBOs), definitions of roles and responsibilities for public and private actors and coordination mechanisms.
- Recognising Ethiopia's considerable attention to increase on-farm productivity and commercialisation, due attention needs to be given to its innovation policies and strategies that address market failures.
- Policy needs to play crucial roles by developing appropriate incentives and practices to stimulate actor's behaviour for friendly relations, innovations and inter-organisational collaboration to deliver a more context

demand driven approach than supply driven approach.

- The study found that informal social networks-farmer to farmer and farmers to traders are also part of innovation network. In this regard, a public actor needs to link these networks to other formal networks for active social learning and knowledge circulation
- Considering the diverse and complex changing of rural problems in general and coffee sub-sector in particular, coffee farmers need more diverse innovation network with diverse actors both at production and market level to foster innovation processes. In this regard, role of government on rural innovation policy is indispensable.
- Public actors need to ensure participation of farmers and other relevant actors during innovation development processes.
- In order to ensure innovation capacities of rural farmers under dynamic market environment both regional and national government needs to increase public investment to human capital, rural infrastructure, coffee research and innovation for the sector improvement.

7. Future research directions

Recognising the priorities of Ethiopian government placed on coffee and the importance of the commodities for the national Gross Domestic Product (GDP), these findings puts a number of future research and policy consideration.

- Government policy needs to encourage research works on innovation perspectives (both scientific and farmer innovation) in order to get better picture of social learning, networking and negotiation capacity of different actors. In this regards the roles of public research and university is an indispensable.
- Participatory and specific agro-ecology based action research and policy making at grass root level that considers priorities, problems, opportunities will be an indispensable solution to critically seize the development objectives of the sector.
- Recognising Ethiopia's considerable attention to increase on-farm productivity and commercialisation, due attention needs to be given to its innovation policies and strategies that address market failures.
- Participatory and specific agro-ecology based policy making at grass root level that considers priorities, problems, opportunities will be an indispensable solution to critically seize the development objectives of the sector.
- The public actors need to review their communication strategy to improve knowledge circulations and scaling up of innovative knowledge like use of different kinds of media and modern media.

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