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Sustainability of the innovation platforms and associations among smallholder dairy farmers in Lushoto and Korogwe districts, Tanzania

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SUSTAINABILITY OF THE INNOVATION PLATFORMS AND ASSOCIATIONS AMONG SMALLHOLDER DAIRY FARMERS IN LUSHOTO AND KOROGWE DISTRICTS, TANZANIA

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A Thesis Submitted in Fulfillment of the Requirements for the Degree of Master's in Life Sciences of the Nelson Mandela African Institution of Science and Technology

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ABSTRACT

The study examines the sustainability of the innovation platforms (IPs) and associations among smallholder dairy farmers in Lushoto and Korogwe districts in Tanzania. Specifically, the study has characterized dairy IPs and associations; identified key constraints facing IPs and assessed the sustainability of the dairy IPs. The study has used cross section design. A sample size of 210 was selected through purposive and random sampling. Quantitative and qualitative data were collected by using structured questionnaire, focus group discussions and key informants interviews. While descriptive statistical was used to analyze quantitative data using statistical package for social science version 21, content analysis was used to analyze the qualitative data. The findings revealed that most of the respondents are unaware of IPs. The findings also identified major strengths of availability and use of constitution and by-laws, defined organizational structures and access to farmers training. The major weaknesses found were missing key actors such as input suppliers and financiers, insufficient fund, poor meeting attendance and high dropout. The identified opportunities were availability of committed farmers and high milk demand in the market, availability of input suppliers, extension services, financial and micro finance institutions. However, major threats to IPs were unstable milk price, high cost of borrowing and environment degradation which leads to drought. In addition, the study characterized and grouped stakeholders into eleven group's base of their interests, role, interaction, influence and contribution to IPs. For sustainability purposes, this study recommends the effective participation of the actors in the IP and the interest of each stakeholder should be addressed in the IP. Awareness should focus on the platform and association's membership contributions and benefits of participation in the IP and association. Missing actors should be included in the IPs and work with other stakeholders. Platform members should also be trained in relevant skills to improve their operations. Finally, IP members should initiate business activities that will enable platform to obtain funds to implement its activities.

DECLARATION

I, Humphrey P. Putaa do hereby declare to the Senate of Nelson Mandela African Institution of Science and Technology that this thesis is my own original work and that it has neither been submitted nor being concurrently submitted for degree award in any other institution.

_____ _____

Humphrey P. Putaa **Date**

Name and signature of candidate

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CERTIFICATION

The undersigned certify that they have read and hereby recommend for examination of a thesis entitled **"Sustainability of the innovation platforms and associations among smallholder dairy farmers in Lushoto and Korogwe districts Tanzania"** to be accepted in fulfillment of the requirements for the Degree of Master's in Life Sciences of the Nelson Mandela African Institution of Science and Technology, Arusha, Tanzania.

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DEDICATION

This work is dedicated to my beloved parents Peter Putaa and Eliafile Jackson Ayo who laid out my foundation for better future. Dedication also is extended to my beloved friend Augustina Mattowo who was hand in hand with me spiritually and materially.

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LIST OF ABBREVIATIONS AND ACRONYMS

CORAF/WECARD	West and Central Council for Agriculture Research and Development
DDF	Dairy Development forum
GDP	Gross Domestic Product
FGD	Focus group discussion
NGO's	Non-governmental organizations
ILRI	International livestock Research Institute
IP	Innovation platform
IPs	Innovation platforms
MU	Mzumbe University
NM-AIST	Nelson Mandela African Institution of Science and Technology
OECD	Organization for Economic Co-operation and Development
RIU	Research into Use
SACCOS	Saving and credit cooperatives
SDGs	Sustainable development goals
SPSS	Statistical package for social science
SUA	Sokoine University of Agriculture
SWOT	Strength, weakness, opportunity and threat
TALIRI	Tanzania Livestock Research Institute
TSh	Tanzania shillings
USh	Uganda shillings
URT	United Republic of Tanzania

CHAPTER ONE

INTRODUCTION

1.1 Background information

In African countries majority of population depends on agriculture for their livelihoods (Makini *et al*., 2013). Fatunbi *et al*. (2016) assert that 70% of the African population depends on agriculture sector to make their living. This sector contributes about 33% of the Gross Domestic Product (GDP) to the economy of the African countries. In Tanzania for example 75% of the population depends on agriculture sector for their livelihoods and this sector contributes about 25% of the Gross Domestic Product (GDP) to the economy of the country (URT, 2017). Hence any improvement of agriculture sector will eventually improve the living standard of people (Makini *et al*., 2013). Despite the potential of agriculture sector to the economy of African countries, the sector experienced many challenges such as; low yielding, poor breeds, diseases and pests, poor market, poor infrastructure, poor and limited access to inputs supplies, credits and extension services, inappropriate policies, poor storage facilities, poor capacity of processing and product development, high cost of technologies, improved technology are not generated in biophysical and socio-economic condition within which smallholder farmers operate, weak linkage and interaction between value chain actors, (Fatunbi *et al*., 2016; Tenywa *et al*., 2011; Fatunbi *et al*., 2015).

Different approaches that emerged and change over time have been used to address challenges facing agriculture sector in African (Nederlof *et al*., 2011a). Starting in 1950s when linear approach was the main model used to enhance productivity in agriculture sector. The approach involves researchers, extension agents and farmers (Nederlof *et al*., 2011a). In this approach researcher produces technologies and extension agent transferred it to farmers and farmers are expected to adopt and utilize it in their field (Ampadu-Ameyaw *et al*., 2016). Later on, this approach was criticized due to its failure to involve and acknowledge the knowledge of farmers in the generation of technology (Nederlof *et al*., 2011a; Nederlof and Pyburn, 2012).

Weakness of linear approach leads to the emergence of holistic approach in 1970s which focused on entire farming system with the aim of understanding the challenges farmers faced (Nederlof and Pyburn, 2012). In this approach, multidisciplinary team of researchers visited farms and listened to farmers and collaborated with them and attempted to understand farms

as a system. The main learning and teaching activities under this approach consist of analysis of the field trials in the farmer's field, monitoring and evaluation to what extent farmers adopted technology and continued to utilize in their field (Amankwah *et al*., 2015). This approach also demonstrated some limitations such as the complexity of farming system which makes it impossible to keep track of so many factors like biological, social and technology (Nederlof and Pyburn, 2012).

In the 1980s, participatory approaches such as farming System Research (FSR) and Farmer Field Schools (FFS) emerged (Makini *et al*., 2013).The main goal of these approaches was to generate technology that suites smallholder farmers and to ensure adoption of technology so as to increase productivity and income of the farmers. Farmers were involved in the process of producing, testing and evaluating technology to enhance agriculture production (Mulema, 2012). The major limitations of this approach its failure to recognize institution and organization constraints as well as importance of multi-stakeholders involvement in the process of enhancing innovation (Makini *et al*., 2013). Due to weakness of participatory approaches, in the 1990s and 2000s agricultural innovation system approach emerged. The approach recognizes the role of institution, policy and multi-stakeholders involvement in enhancing innovation in the agriculture sector (Nederlof and Pyburn, 2012). It was from this approach where innovation platform emerged as mechanism to enhance interaction among multi-stakeholders in agriculture sector (Pali and Swaans, 2013).

Innovation platforms (IPs) have become a common tool used to enhance multi-stakeholders collaboration in agricultural research for development programmes (Schut *et al*., 2017). Innovation platform facilitate interaction between multi-stakeholders with different background and interest in a selected agriculture value chain that collaborate in identification of challenges, joint exploration of opportunities and finding of solutions leading to the promotion of agricultural innovation along the target agriculture value chain (Fatunbi *et al*., 2016).

1.2 Problem statement and justification of the study

The motive behind this study reclines of the fact that weak linkages and interactions among the key actors along the dairy value chain is reported to be amongst the major hindrance towards improved milk production and marketing amongst the smallholder dairy farmers

(Omore *et al*., 2015). In line with that, innovation platform is an approach that is believed to improve agricultural productivity through enabling environment for stakeholders to communicate efficiently and co-finding solutions for resolve productivity and marketing constraints (Tenywa *et al*., 2011). Despite the potential role of IPs to act as a tool for enabling stakeholders to overcome their constraints; IPs are still uncommon in Tanzania, particularly in the dairy sector. Only two dairy IPs exist in Lushoto district at village level which were formed in 2014 by MoreMilk Project under the International Livestock Research Institute (ILRI). Furthermore, very little is known with regard to their sustainability. In addition assessments of the sustainability of the platforms have not been formally conducted yet. Therefore, this study aims to fill the gap on assessment of the enabling environment for existence and sustainability for the aim of facilitate the formation of efficient and sustainable innovation platform that are effectively linked to markets in the study area.

1.3 Objectives

1.3.1 General objective

The overall objective of this study is to facilitate formation of sustainable innovation platforms that are effectively linked to markets as part of university – facilitated outreach programme with communities.

1.3.2 Specific objectives

(i) To characterize innovation platforms, associations and key actors along the diary value chain in the study area.

(ii) To identify the key constraints facing sustainability of the innovation platforms in the study area

(iii) To evaluate sustainability of the innovation platforms in the study area.

1.4 Research questions

(i) What are characteristics and roles of' innovation platforms, associations and key actors along the dairy value chain?

(ii) What are constraints facing sustainability of innovation platforms?

(iii) In what ways sustainability of innovation platforms can be achieved?

1.5 Significance of the study

The study contributes to documenting empirical evidence on the role of IPs on marketing relationships in dairy value chain development and the use of such approaches as an alternative to linear technological innovation and conventional development interventions. The findings will help to generate new knowledge that will contribute positively to the improved livelihood of smallholder dairy farmers through uncovering the strengths, weaknesses and opportunities of IPs in overcoming milk production and marketing challenges. In addition, formulation of new and improved innovation platform will be facilitated in collaboration with the key actors in the study area. This study will also help policy makers and development planners in designing interventions that will benefit the farmers. Furthermore this study is line with Sustainable Development Goals (SDGs) number two which aimed at ending hunger, achieve food security and improve nutrition and promoting sustainable agriculture.

CHAPTER TWO

LITERATURE REVIEW

This chapter covers literatures reviewed of the study. The chapter described the concepts of innovation and innovation platform, innovation platform membership, level of operation of the innovation platform, innovation platform formation process, sustainability of the innovation platform, agricultural innovation platform in Africa and conceptual framework of the study.

2.1 Innovation

Innovation is defined as an idea, practice or object that is perceived as new by an individual or other units of adoption (Rogers, 2003). It is also referred as implementation of a new or significantly improved product or process, a new method of marketing, or a new organizational method (OECD, 2005). Posthumus and Wongtschowski (2014) define innovation as the process of putting new ideas to certain location or place into practice and this way improving the situation of those living in the area. In agriculture sector, new ideas can be; a new ways of irrigating fields, a new way of organizing farmers to bulk their produce and new policy that support smallholder farmers getting loans from the bank.

Moreover, as a process, innovation have been explained in terms of various phases and elements, for instance CORAF/WECARD (2012) argues that innovation as a process consists of three basic elements which are:

(i) Technological: including new species, breeds, processing equipment, varieties and management practices such as pests and diseases, irrigation and agronomic practices.
(ii) Organizational: involving new ways of organizing and delivering knowledge.
(iii) Institutional: including rules, cultures, norms, behavior, policies and laws

Apart from that OECD (2005) categorises innovation into four main types:

(i) Product innovation: refers to the introduction of a good or service that is new or significantly improved. While new product involves good and services that are differ significantly in their characteristics from previously product or services produced, the improved product consist of any significant improvements of product include; change in material, components and other characteristics

(ii) Marketing innovation: refers to introduction of new method of marketing which includes significant changes in product design (appearance of the product), product placement (new sales channels), product promotion and new pricing strategies.

(iii) Process innovation: refers to the new or significantly improved production or delivery methods. This involves changes in techniques, equipment, and software used in production of goods and services.

(iv) Organizational innovation is the process of implementing new organizational method.

In addition, Jose (2014) distinguishes three types of innovation:

(i) Institutional innovation: refer to changes in policies, standards, regulations, agreements, models, practices and relationships so as to improve performance of an institution or organization to become more interactive and competitive.

(ii) Technological innovation: refer to application of new ideas, scientific know how to develop, produce, improve goods and services and/or improve production process.

(iii) Social innovation: is the improvement of strategies, concepts, ideas, goods or services and organization that meet the social needs.

2.2 Innovation platform concept

Innovation platform (IP) has been defined in many ways and by different authors. Homann-kee Tui *et al*. (2015) define IP as a forum where a group of stakeholders with different background and interests which include farmers, extension agents, private sectors, local and national decision makers come together to diagnose the challenges and opportunities and find solutions. On the other hand IP can be defined as a forum established to facilitate interaction and learning among stakeholders selected from a commodity chain leading to a participatory diagnosis of problems; jointly exploration of opportunities and investigation of solutions leading to the promotion of agriculture innovation along the targeted commodity chain (Adekunle *et al*., 2010; Fatunbi *et al*., 2015).

According to Fatunbi *et al*. (2016), IP is considered as a multi-stakeholders forum for information sharing and knowledge exchange along a commodity value chain with a view to enhancing agricultural productivity and socio-economic wellbeing of the stakeholders. In most cases IP involve multiple local key stakeholders with different background who were brought together to address common challenges and opportunities in the agriculture sector (Lema, 2014). Therefore in the agricultural platform, innovation emerged when diverse

stakeholders with different background and interest interact, communicate, cooperate and shared ideas, knowledge, opinion, and tasks to come up with new solutions (Posthumus and Wongtschowski, 2014).

2.3 Innovation platform membership

Based on Nederlof *et al*. (2011) the membership and engagement of the stakeholders in the IP depends on the focus of the platform. Ampadu-Ameyaw *et al*. (2016) asserts that composition of actors may change when platform achieves its objectives, change its focus or when new issues emerge. When any of these happened, some of the initial actors will leave the platform and other new actors will be invented to join the platform. Therefore, the membership of an IP may change over time (Schut *et al*., 2017). In the agriculture sector, IP comprises multi-stakeholders with different background and interest which may include; farmers and their organizations, traders, input suppliers, processors, services providers, wholesalers, retailers, policy makers, agriculture extension agents, financial service providers, non- governmental organization (NGO's), environmentalist, retailers, wholesalers and media representative (Boogaard *et al*., 2013; Fatunbi *et al*., 2016; Nederlof *et al*., 2011).

2.4 Levels of operation of the innovation platform

Innovation platform can be formed and operated at a local level (a village or a community level and at a district level), the intermediate level (regional level), national level and international level (Nederlof *et al*., 2011b; Tucker *et al*., 2013). At a local level platform focus on identifying opportunities and/ or address the local problems by identifying practical solution of the local problem. It always links actors from the local level who communicate and share ideas to address the common challenge found at local level (Pali and Swaans, 2013). At the intermediate level and national level platform focus on influence policy process by informing policy makers who formulate policies that support local activities. At the international level, platforms aimed at addressing the controversial issues that occur at national levels (Tucker *et al*., 2013).

2.5 Innovation platform formation process

The formation of the IP passes through various stages and it can vary depending on different reasons as depicted by various scholars. Makini *et al*. (2013) illustrate that IP can be formed using four phases known as; initiation, establishment, management, and sustainability. Based

on those phases Adekunle *et al*. (2010), Fatunbi *et al*. (2016) and Fatunbi *et al*. (2015) identify nine stages of the IP formation; these stages are as follows:

(i) Location of the site for IP activities: The choice of the site for establishing IP can be determined by the socio-economic conditions, biophysical, interest, and willingness of the local people in a given area (Makini *et al.,* 2013). Moreover, the site can be selected based on the project aim. For example if the project aims at addressing the challenges and/or exploiting opportunities of the given area it will lead to the establishment of the platform in that area. Also, site can be chosen by the initiator who can be either individual, organization or institution (Adenkunle *et al*., 2013).

(ii) Identification of commodity or system of focus and analysis of its market chain: The commodity or system of focus can be identified by the organization or institution who decides to initiate IP (Adekunle *et al*., 2010). After identification of the commodity the next activity is value chain analysis of selected commodity or system from production to consumption to identify challenges facing productivity, existing opportunities for innovation as well as overview of value chain actors (Adekunle and Fatunbi, 2012). Moreover, scoping study can be undertaken to determine and understand the real problems and/or opportunities of the given commodity through use of various methods such as key informant interviews, focus group discussions, literature reviews, baseline survey, semi-structure interviews, observations, and historical trends (Lema, 2014).

(iii) Identification of the stakeholders: These can be determined based on the value chain analysis of the identified commodity (Fatunbi *et al*., 2015). Thereafter, the stakeholders analysis can be conducted to identify the skills, weakness, strengths, opportunities of each stakeholder as reported in Adenkunle *et al*. (2013). Furthermore, the roles of stakeholders in overcoming challenges and /or exploit existing opportunities should identified as well as interest of each stakeholder in working with others and potential benefits of stakeholders in the platform (Tenywa *et al*., 2011).

(iv) Engagement of researchers: The involvement of socio-economic researchers and agricultural researchers is very important for the function of IP (Adekunle *et al*., 2010). Researchers from various areas including market, productivity, policy,gender, natural resources management and product development should involved in the IP (Adekunle and Fatunbi, 2012). The involvement of researchers in the platform provide various contributions such as developing and improving existing technologies

along the commodity value chain, capacity building to the actors, action plan development, support stakeholder analysis and mapping. More importantly, researchers should change when new issues emerge in the IP (Fatunbi *et al*., 2016).

(v) Development of IP governance and management guidelines: The mode of operation of the IP can be formal or informal (Nederlof and Pyburn, 2012). Formal IPs have strong rules and regulations that guide the operations while informal IPs have loose regulations and rules that guide the operations (Adekunle *et al*., 2010). Innovation platforms managed by the executive committee with sets of rules, regulations, and guidelines (Fatunbi *et al*., 2016). Executive committee of the IP usually elected by general assembly consists of all relevant stakeholders from commodity value chain. Elected committee manages the affairs of the IP on behalf of all relevant stakeholders. Then, executive committee in collaboration with facilitator leads other actors to develop bylaws and constitution that govern the operation of the platform (Adenkunle *et al*., 2013).

(vi) Facilitating interactions of stakeholder's: After identification and involvement of relevant stakeholders in the IP, stakeholder's interaction should be done through use of meeting, logistics, contacts and communication channels (Adekunle *et al*., 2010; Adekunle and Fatunbi, 2012). Moreover, the interaction of stakeholders in the platform depend on the good facilitation skills that facilitator should possess (Homann-kee Tui *et al*., 2015). Facilitation role at early stage it done by institution or organization initiate IP and later on, facilitation role should be transferred from initiator to the other stakeholders. However, before transferred it capacity building to the stakeholders on the role of facilitation is very important (Brouwer *et al*., 2016; Pali and Swaans, 2013).

(vii) Development and implementation of IP action plans: under this stage, stakeholders convene a series of meetings to develop action plans by using participatory methods (Makini *et al*., 2013). The developed action plans by stakeholders should include the following elements; specific activities, what will be done, who will be responsible, timeline, expected output, indicators, location and what kind of financial resources required for the identified activities (Homann-kee Tui *et al*., 2015). Following stakeholder's development of action plans its implementation done at location site. Different activities can be undertaken such as field exchange visit, field days and trainings to build capacity of the platform actors to implement activities of the selected commodity value chain (Lema, 2014).

(viii) Establishment of participatory monitoring and evaluation measures to draw the lessons: A monitoring and evaluation indicators and tools used to collect data should develop and agreed by all stakeholders in a participatory way through the guide of facilitator (Homann-kee Tui *et al*., 2015). According to Lundy *et al*. (2013) developed indicators should focus on activities that aim to address challenges and /or utilize opportunity, output includes changes in attitudes, knowledge, and practices of the platform actors and impacts of the platform tothe local community. Monitoring process is ongoing activities it usually done by one person selected among platform members. Evaluation process conducted periodically by the external facilitator (Makini *et al*., 2013).

(ix) Review of implementation and lesson learning: under this stage, the platform undertakes various activities including reviewing of action plans, lessons learn from the platform and identification of new issues emerge from the commodity value chain, and developing strategies for sustaining and scaling out IP (Fatunbi *et al*., 2016; Fatunbi *et al*., 2015).

2.6 Sustainability of the innovation platform

According to Makini *et al*. (2013) sustainable IP is the platform that is able to continually innovate, consolidate its gains, change its focus when necessary, renew its membership to address new issues and thereby continue to generate benefits for its members over time with relative stability. Pyburn and Mur (2014) distinguish four aspects of sustaining IP which are; sustained motivation, sustained resources, sustained capacity and sustained relationship. These aspects are discussed below;

Sustained motivation is the process creating a sense of ownership and commitment among the actors in the platform. Actors are motivated by the incentives that obtained from the platform. Similarly, the study by Mulema and Mazur (2015) reported that incentives that actors obtain from the IP motivate to participate in the activities of the platform and contributing to sustain IP, however, the incentives differ from one actor to another. Farmers are motivated by access to knowledge and skills in production, access to credit, access to input, value addition and access to market. Input suppliers motivated by earning profit from the selling of inputs, access to market of their inputs. Processors motivated by access to available products or raw material needed for production, access to new market of their

products, and researchers and extension agents motivated when they achieve organization goals of improving farmer's livelihood (Makini *et al*.,2013; Mulema and Mazur, 2015).

Sustained resources means ensuring IP has enough financial and human resources to operate joint activities. According to Schut *et al*. (2017) IP required various resources such as time, funds; human resources such as facilitator, stakeholders, coordinator, and researchers; physical resources such as land, meeting venue, seeds and research technologies. However, financial resources is the most important resources because joint activities of the platform such as meetings, workshops, trainings, demonstrations, communication, facilitation exchange visit depend on funding (Kusters *et al*., 2017; Makini *et al*., 2013). For sustaining IP activities long-term funding is important. Most of the IPs are funded by the institution or organization that initiates IP while other sources of funds may include; membership contribution, government support and private sectors support (Schut *et al.*, 2017). Moreover, Adenkunle *et al*. (2013) pointed out that for sustainability of IP actors must empowered with skills of writing proposal and resources mobilization.

Sustained capacity is based on building capacity of individual actors to innovate and organizational capacity to support innovation. Schut *et al*. (2017) pointed out that it is important to develop capacity of individual actors in the platform to innovate and address their challenges. In another study, Homann-Kee Tui *et al*. (2015) revealed that input suppliers and traders need training on cost-benefit analysis and ways to communicate market requirements to farmers. In addition to that Schut *et al*. (2017) noted that farmers need to be capacitated on different techniques of production that will improve their production, farmer's organization need to be empowered on how to organize themselves and how to manage marketing their products and research institution need training on how to facilitate and manage interaction among the actors in the platform. Sustainability of IP depends on the good facilitation skills of the facilitator (Posthumus and Wongtschowski, 2014). A good facilitator must be able to manage relations, negotiation and power dynamic, help weaker stakeholders, manage conflict, listening and able to understand, knowledgeable about subject area, neutral and objective, clear vision to guide IP, sensitive to culture and gender issues (Homann-Kee Tui *et al*., 2015). Moreover, sustainability is also enhanced when IP facilitated by the initiator at the beginning and later on transferred to the identified actor among platform members with a talent in facilitation (Makini *et al*., 2013).

Organizational capacity to support innovation process involves the level of formalization and institutionalization of the IP. Wennick and Ochola (2011) argued that formalization of the IP is the legal registration of the platform as an association or any other form of organization and the existence of rules, regulations, and structure that govern activities of the platform. Formalization aspects of the IP includes; constitution and agreed written rules and regulations. It also include good governance represented by the criteria such as; regular meeting, accountability, transparency, participation, good communication, coordination, good leadership, and organization structure all these aspects guide interaction among the actors in the platform and help to sustain it (Nederlof *et al*., 2011a; Sanyang *et al*., 2014). The last way of sustaining IP is through sustained relationship. The relationships between stakeholders can be created by building trust among the actors. Trust creates cooperation among stakeholders in implementing platform activities, therefore, this contribute to sustaining IP (Pyburn and Mur, 2014).

2.7 Agricultural innovation platforms in Africa

Many African countries use IP as an approach for promoting agricultural innovation. In Democratic Republic of Congo (DRC) for instance, IPs was formed to address farmer's challenges including; poor quality of bean seed, poor postharvest handling practices, and poor market access. Through IPs approach farmers improved knowledge of bean production, improved bean varieties introduced such as nguaku-nguaku, Kiangara, MORE and VCB, farmers access it, bean yield increased from 350 to 820 kg ha-1 increase price of bean, access to credit, access to seed market, and increased income of the farmers (Njingulula *et al*., 2014).

A study by Nyamulinda *et al*. (2011) reported that Gataraga IP in Rwanda has initiated the innovative post-harvest technologies which include cleaning, sorting, grading and packaging to improve value chain of Irish potatoes. Innovative post –harvesting technologies helped small-scale farmers' to access better market, increased price of Irish potatoes to about 30% and income of the farmers who sell their Irish potatoes through groups organized by the platform increased to 30%. In addition, Dusengemungu *et al*. (2014) show that in Nyagatare district, Rwanda maize IPs was initiated by the Research into Use. The platforms identified lack of good quality seed and poor crop management practices are the major constraints that limit maize production and farmer's access to income. Through platforms quality protein maize varieties were introduced, farmer's knowledge and skills in using improved maize

production technologies were increased through trainings; farmers were linked to market and access better price. Hence, maize yield increase from 0.5 tonnes per hectare to 6 tonnes per hectare as well as income of the farmers increased (Dusengemungu *et al.,* 2014).

In Ethiopia, Borena zone livestock development stakeholder platform was formed to address the challenges facing livestock value chain which related to productivity, market, and policy. The platform brings together livestock value chain actors to interact and address challenges facing livestock value chain (Taye *et al.*, 2015). Through interaction of the stakeholders in the platform nine milk shed and milk collection centers established, modalities of operating milk collection center established, extension materials on goats production and diseases control was prepared and distributed. Information sharing between regional and national stakeholders involving in livestock marketing was created (Taye *et al.*, 2015).

In Malawi, IPs was established in Thyolo district to address the challenges facing vegetable producers which are lack of access to seed, lack of knowledge and technical skill in vegetable production and poor local market (Nyikahadzoi *et al.,* 2014). After establishing IP vegetable producers were trained on right type of vegetable needed by customers and how to produce quality vegetable. Furthermore, farmers were linked with markets and financial institution to access loans to purchase inputs. As the result number of farmers produces vegetable increase by more than 120% in one village (Nyikahadzoi *et al.,* 2014). In addition to that, South-West Uganda, Bubare sorghum IP has enable to address the challenge of productivity of the sorghum by adding value (Boogaard *et al.,* 2013). Platform stakeholders and Huntex processing industries cooperate together by adding value to traditional sorghum through processing and develop non- alcoholic beverage called Mamera. In addition to that Mamera product was packaging and sold to the market. As result farmers increase production and income, as well as processors, also increased their income (Nyamwaro *et al.,* 2013).

Moreover, in Bungoma County in Kenya, farmers IP were established to enable farmers in Bungoma County who experienced low agricultural productivity to access good agricultural practices and increase their production. Bungoma platform has helped farmers to access seed and farming technologies and increase maize yield from 1.8 to 3.6 per hectare and beans yield from 0.2 to 1.1 per hectare (Makini *et al.,* 2016). In Ghana, IP was formed to enhance rice production. In which rice value chain stakeholders were bringing together to interact and find the ways of improving rice production so as to ensure food security (Martey *et al.,* 2014). In Burkina Faso, IPs were initiated and used by the Volta 2 project to enhance food

security and reducing poverty, has help the farmers to increase and improve livestock production, market access, and better access to credit (Teno and Cadilhon, 2016).

In Tanzania, local dairy IPs were established in Mbuzii and Ubiri villages in Lushoto district by MoreMilk IT project managed by International Livestock Research Institute (ILRI). The project use IP to improve productivity of dairy cattle using improved feeding practices and better arrangement for milk marketing (Paul *et al*., 2015). Moreover, at regional level, Tanga dairy platform was created in 2008 by the Research into Use (RIU) to bring together dairy stakeholders from the region to address the challenges facing dairy value chain at regional level (Cadilhon *et al.,* 2016). The platform has achieved to remove the limitation proposed by Tanga city council of limiting dairy farming activities in the urban area. More important, platform managed to lobby policy makers to reduce value added tax on diary inputs and products. Thus influence national assembly at national level to reduce the value added tax from 18% to 0% on all dairy inputs and products (Cadilhon *et al.,* 2016).

Furthermore, in Iringa, Tanzania IP were formed in Magozi and Kiwere irrigation schemes. Those platforms were focused on tackling challenges facing rice farmers which are low rice yields and poor quality of rice, lack of knowledge of water use, poor road infrastructure and poor storage of rice facilities (van Rooney *et al.,* 2017). Rice value chain actors and political representative were bringing together to tackle the identified challenges. The platforms has managed to address the challenges by improve water management structure, roads were improved, rice storage and milling facilities established and farmers access knowledge on how to irrigate their farms efficient (van Rooney *et al.,* 2017). In addition, there is Tanzania Dairy Development Forum (DDF) launched in 2013, which is an IP operating at national level under supervision of Tanzania Dairy Board (TDB). This platform brings together national dairy actors who collaborate and explore opportunities for promoting development of Tanzania Dairy Industry (TDI) and addressing the challenges facing dairy sector in the country (Paul *et al.,* 2015; Omore *et al.,* 2015).

2.8 Conceptual framework

The conceptual framework shows the relationship between dependent variable and independent variables. In this study the dependent variable is sustainability of the IP while the independent variables are; motivation among members, resources, communication and information flow, market and capacity building. Based on the diagram the sustainability of

the IP depends on the following factors which are; motivation, commitment and sense of ownership among the actors to the platform, resources such as finance, availability of inputs and physical facilities, organization and management practices, communication and information flow, stakeholders linkages and capacity building to the individual actors and organizational level. The relationship between the variables is shown in the Figure 1 below:

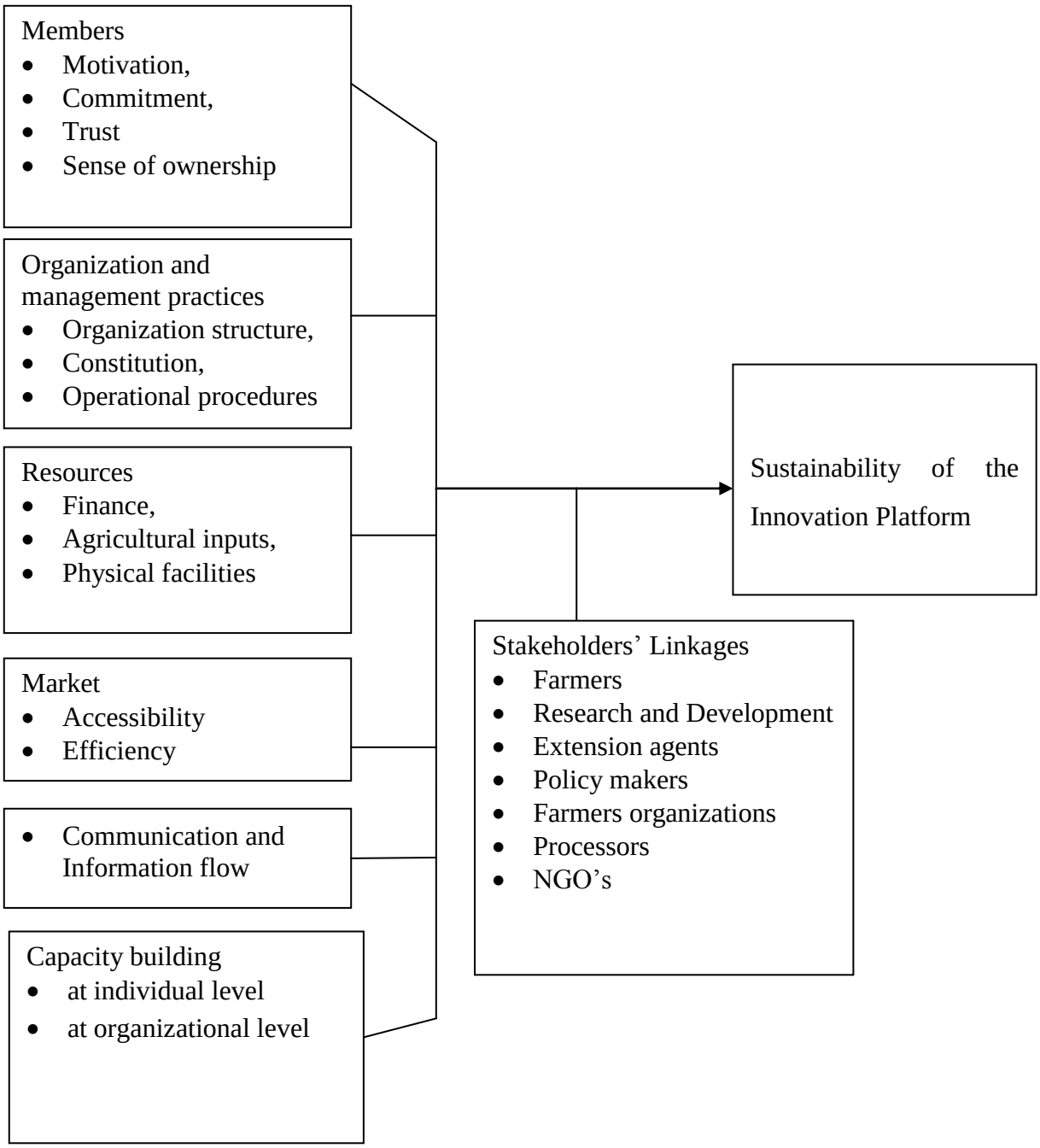

Figure 1: Conceptual framework of the study

CHAPTER THREE

MATERIALS AND METHODS

This chapter described various aspects including; description of the study area, research design, sample size and sampling procedures, data collection, processing, and analysis as well as methods employed in data collection.

3.1 Description of the study area

The study was conducted in two districts of Lushoto and Korogwe located in Tanga region. Lushoto is located in the West Usambara Mountains in Tanga region in the north east of Tanzania. The district covers area of 3500 km^2 equivalent to 12.8% of Tanga region. It is bordered by Same district in the north-west, Republic of Kenya in the north-east and Korogwe district in the south. Administratively, the district has eight divisions which were divided into 44 wards and 176 villages. According to national population and household census of 2012, Lushoto district had population of 492 441 people (URT, 2013).

Korogwe district is located in northeastern in Tanzania. It borders Lushoto district in the north, Muheza district to the east, Handeni district to the South and West Kilimanjaro to the west. It covers area of 3544 km^2 equivalent 13% of Tanga region. Administratively, the district is divided into 20 wards. According to national population and household census of 2012, Korogwe district had a population of 242 038 people (URT, 2013). The major economic activities of these districts are agriculture, tourism and forestry. However, crop production, livestock husbandry, forestry are the main sources of income. The main crop grown includes potatoes, beans, cassava, maize, banana, vegetables, fruits, Irish potatoes, tea, coffee, paddy and sisal. Livestock keeping include; cattle, goats, sheeps, chicken, duck, guinea, fowls, pigs and rabbit.

3.2 Research design

The study used a cross-sectional design. The design enable researcher to collected data at a single point in time from a representative subset of specified population (Visser *et al.*, 2000). The design was chosen because it is suitable for descriptive study and it is economical in terms of time and financial resources. Also it enable to use different survey methods for collecting both qualitative and quantitative data (Kothari, 2004).

3.3 Sample size and sampling procedures.

3.3.1 Sample size

The sample size of 30 respondents was randomly selected from each village which makes a total sample size of 210 respondents from seven villages. According to Hoggs and Tanis (2005) a minimum sample size per village for socio-economic study could be greater than 25 or 30 respondents.

3.3.2 Sampling procedures

A combination of convenient, purposive sampling and simple random sampling was employed in the study area. Two districts, namely Lushoto and Korogwe, were purposively selected for this study. At the districts level, six villages of Ubiri, Ngulwi, Mbuzii, Viti, Bombo, and Hambalawei in Lushoto district and one village (Hale) from Korogwe district were purposively selected.The rationale for selection of villages was due to presence of adequate number of dairy farmers, presence of IPs in two villages (Ubiri and Mbuzii) and farmers dairy associations in three village (Ngulwi, Viti and Hale). In addition, purposive sampling was also used to select key informants and respondents for focus group discussions. The respondents for focus group discussions and key informants interview was convenient and purposively selected because they possess useful and relevant information about dairy farming and IP.

Furthermore, simple random sampling was used to get the sample of respondents for interviewed through use of lottery method. A list containing names of all dairy farmers in the respective village was used as a sampling frame. A list was obtained from village extension officers. Each names obtained from the village extension officer of each village was written down on separate pieces of paper and then these pieces of paper folded and mixed into a box. After, mixing into box 30 respondents was chosen randomly from the box by researcher. This process was done for each village of the study.

Table 1: Sampling distribution of the respondents in the study villages

District	Village	Household sample size
Lushoto	Mbuzii	30
Lushoto	Viti	30
Lushoto	Ngulwi	30
Lushoto	Hambalawei	30
Lushoto	Bombo	30
Lushoto	Ubiri	30
Korogwe	Hale	30

Source: Own data, 2016

3.4 Data collection methods

For the study purpose, both primary and secondary data were used. According to Kothari (2004) primary data are those data which are collected afresh and for the first time, while secondary data are those data which have already collected by someone.

3.4.1 Primary data

The primary data was collected through using structured questionnaire with open and closed-ended questionnaire and checklist for the key informants interview and focus group discussions.

(i) Household interview

The structured questionnaire with open and ended questionnaire was used in this study. However before administering questionnaire to the respondents, a researcher pre-tested the questionnaire to 10 respondents to check the reaction of the respondents to the questions and modified it before administered to 210 respondents.

Plate 1: Enumerator administering questionnaire to the selected household

(ii) Key informant interview

Key informants interview were conducted through use of checklist to collect more information about dairy value chain, IP and dairy farmers association. The key informants that were interviewed were district cooperative officer, district livestock and fishery officer, IP chairman and secretaries, village extension officer, cooperative chairman and secretary, and farmer's association chairman and secretary. These informants were selected because they possess first-hand information and knowledge about the IP, farmers associations and dairy related activities.

(iii) Focus group discussion (FGD)

Focus group discussion (FGD) was conducted through use of checklist. The group discussions were held in seven villages at respective village government office and the average of participants was ten members. According to Eliot and associate (2005) the size of the participants in the focus group discussion should range between six to ten. Participants that were involved in discussions were; members of IPs, members of dairy farmers association and other dairy farmers who were not member of IPs and associations. During discussions a researcher guides the discussions while a rapporteur recorded all participants view. In addition, digital recorder was used to record participants view during the focus group discussions.

Plate 2: Facilitator with selected members of focus group discussions

3.4.2 Secondary data

Secondary data were collected by reviewing documents from district livestock office, district cooperative office, village extension offices, and online IP reports prepared by Moremilk project and other non – governmental organization.

3.5 Data processing and analysis

The collected data were coded and summarized before being entered into computer for processing. The Statistical Package for Social Science (SPSS) computer program (IBM statistical software version 21) was employed for data analysis. Ultimately descriptive statistics computation such as cross tabulation, frequency and percentage was computed and presented in tables and figures. Qualitative data collected through key informant interviews and focus group discussions were analyzed by using content analysis. The content analysis was done by reading the collected qualitative information and categories by identifying the themes, ideas, and phrases. Then the collected themes were summarized into meaningful information. Furthermore, strengths, weaknesses, opportunities, and threats (SWOT) analysis was used to analyze the strengths, weaknesses, opportunities, and threats of the existing IPs in the study area.

CHAPTER FOUR

RESULTS AND DISCUSSION

This chapter presents the major results and their respective discussion. It is organized into four main sections. The first Section (4.1) presents the results on the socioeconomic characteristics of respondents in the form of age, sex, education, marital status, occupation, household size and years of experience in dairy farming. The second Section (4.2) presented the results with respect the study's first specific objective about characterize innovation platforms, associations and key actors along the diary value chain in the study area. Moreover, the third Section (4.3) covers the second specific objectives on identifying the key constraints facing sustainability of the innovation platforms in the study area. On top of that, the fourth and last Section (4.4) presented results of the third specific objective on assessment of sustainability of the innovation platform.

4.1 Socio-economic characteristics of the respondents

This section presents the results on socio- economic characteristics of respondents which are described include under sub sections 4.1.1 – 4.1.7 as; age, sex, education, marital status, occupation, household size and years of experience in dairy farming. The summary of socio-economic characteristics is presented in the Table 2.

4.1.1 Age of the respondents

In the finding of the study it has been observed that, 2.9% of the respondents were in age of 20-29 years, 13.8% of the respondents were age of 30-39 years, 24.8% of the respondents were age of 40-49 years, 25.8% of the respondents were age of 50-59 years, and 21.4% of the respondents were age of 60-69 years, 9.0% of the respondents were age of 70-79 years and 2.9% of the respondents were age of 80 years and above. This finding implies that, significant age of farmers engaging in agriculture production range between 40- 59 years. However, according to URT (2016) revealed that most of youth in Tanzania are not engage in agriculture production because they migrate to urban areas to search non-agriculture employment and leaving agriculture sector in rural areas under elders who are not stable in power. Moreover, the study done by Levi (2015) in Kilosa district Tanzania reported that, the age group between 45-64 years are engaging more in agriculture activities than other age group because they are responsible for feeding their families and increase their income so

as to improve the wellbeing. However, Martey *et al.* (2014) proposed that for the sustainability of the IP the initiator should target both young and economical active age group.

4.1.2 Sex of the respondents

Results in Table 2 revealed that majority 81.9% of the household respondents were male while minorities 18.1% were female. This finding implies that majority of the respondents households were headed by males who were involved in dairy farming activities.

4.1.3 Education level of respondents

In term of education level, the finding show that about 83.3% of the respondents had primary education, 3.8% had secondary education, 2.9% had adult education, 4.3% had college education and about 5.2% do not have any formal education. This result revealed that majority of the respondents in the study area had low level of education, which is primary education.This finding is consistent with Dusengemungu (2011) who reported that low level of education limit farmers to get proffesional employment hence this force farmers to engage into agriculture activities as main sources of livelihood. The need for having more educated farmers in Lushoto is clearly observed for more agricultural output and productivity as revealed in Akudugu *et al.* (2011) that well educated farmers adopt agriculture technologies than those farmers with low level of education. This is because those educated farmers can bring agricultural technologies like improved livestock breeds and crop varities to their relative so as to adopt it.In addition to that study done by Akinmusolo *et al*. (2016) reported that literate farmers influence success and sustainability of the IP. This is because educated farmers are able to document individual experience and communicate to other stakeholders. Moreover, Martey *at el*. (2014) reported that education enable farmer to earn income from non-agriculture activities. This reduces the farmer dependency on agriculture activities hence influence participation in the IP.

4.1.4 Marital status of the respondents

The finding in Table 2 below illustrates that 1.4% of the respondents are not married, 84.3% are married, 1.4% are divorced and 12.9% are widow. The findings indicate that majority of the farmers who are involved in agriculture production are married as compared to those farmers who are not married, divorced and widow. Levi (2015) observed that majority of the

farmers who are married participate in agriculture activities in order to improve their income so as to care their dependents. This was also observed by Akinmusolo *et al.* (2016) reported that marital status has effect on the decision of the farmers to participate in the IP activities. This is because farmers who are married are responsible to ensure their access to feeding and financial to their families hence this will influence them to participate in the IP activities in order to improve agriculture production so as to feed their families.

4.1.5 Respondents occupation

The results in Table 2 show that about 2.9% of the respondents practicing livestock farming only, 96.2% mixed farming, and 1.0% civil servant and mixed farming. The result shows that most respondents in the study are practicing mixed farming (crop cultivation and livestock keeping) because each of those activities depend on another for instance while farmers use crop residual as the feed for animal, the animal produce manure which are used to improve soil nutrient for rising crops.

4.1.6 Household size of the respondents

The result in Table 2 indicates that 48.6% of the respondents has household size of 1 to 5 people, 49.0% has household size of 6 to 10 people and 2.4% has household size of 11 to 15 people. This indicates that most respondents in the study site have household size range between 6 to 10 people. The study by Akinmusola *et al.* (2016) observed that household with large number of members can share responsibilities of agriculture production activities to other members of household. This will influence household head to participate in IP because of presence of labour who work on the farm when not present in production area.

Table 2: Socio- economic characteristics of the respondents

Variable	Frequency(n=210)	Percentage
Age of the respondents		
20-29	6	2.9
30-39	29	13.8
40-49	52	24.8
50-59	53	25.2
60-69	45	21.4
70-79	19	9.0
80+	6	2.9
Total	**210**	**100**
Respondents sex		
Male	172	81.9
Female	38	18.1
Total	**210**	**100**
Respondents education level		
Primary education	176	83.8
Secondary education	8	3.8
Adult education	6	2.9
College	9	4.3
No formal education	11	5.2
Total	**210**	**100**
Respondents marital status		
Single	3	1.4
Married	177	84.3
Divorced	3	1.4
Widow	27	12.9
Total	**210**	**100**
Respondents occupation		
Livestock farming only	6	2.9
Mixed farming	202	96.2
Civil servant and mixed farming	2	1.0
Total	**210**	**100**
Household size of the respondents		
1-5	102	48.6
6-10	103	49.0
11-15	5	2.4
Total	**210**	**100**

Sources: Own survey data, 2016

4.1.7 Respondent's years of experience in dairy farming

Results from Table 3 indicate that about 30.5% of the respondents had duration of 20 years and above in dairy farming, about, 30.0% of the respondents had duration of between 10 and 19 years in dairy farming cattle, while 21.4% of the respondents had duration of between 5 and 9 years in dairy farming, and 18.1% of the respondents involved in dairy farming in less than 5 years. According to Akinmusolo *et al.* (2016) demonstrated that when farmers have long experience in farming activities it help famers to assess the performance of current agriculture technologies and traditional agriculture technologies and develop more confidence to take risks related to farming. Based on the findings this give impression that farmers had enough experience on issues related with dairy farming.

Table 3: Farmers experience in dairy farming. (n=210)

Categories of years	Frequency	Percentage
Below 5 years	38	18.1
5-9 years	45	21.4
10-19 years	63	30.0
20 years and above	64	30.5

Sources: Own survey data, 2016

4.2 Characterize innovation platforms and associations in the study area

This Section presents the major results with respect to the study's specific objective one. The characterization of IPs covered the following items: awareness about IP per village; membership in associations and/or IPs; membership criteria; sources of funding that enable IP and association to function; formalization of the IPs and associations; expectation of the dairy farmer's participation in the IPs and associations; expectation of farmer's participation in the IPs and associations; the extent of met expectation; obtained benefits; communication and information sharing among IP members; joint planning, coordination and trust among IPs members; market access, credit access and input access among IPs members are shown in details under sub sections 4.2.1 up to 4.2.11.

4.2.1 Awareness of innovation platform per village

The results on awareness of IP among respondents in Fig. 2 indicate that in Mbuzii village 83.3% of the respondents are aware of IP, while about 16.7% of the respondents are not aware of IP; In Ubiri village 60.0% of the respondents are aware about IP, while about 40.0% of the respondents are not aware of IP: In Hale village about 10.0% of the respondents are aware of IP, while about 90.0% of the respondents are unaware of IP. In Viti village about 30.0% are aware of IP, while about 70.0% of the respondents are unaware of IP: In Ngulwi village about 30.0% are aware of IP, while about 70.0% of the respondents are unaware about IP. In Hambalawei about 6.7% of the respondents are aware of IP, while about 93.3% of respondents are unaware of IP. In Bombo village about 3.3% of the respondents are aware of IP, while about 96.7% are unaware of IP. These results show that most of the respondents in the two villages which possess IPs (Ubiri and Mbuzii) are more aware of IP as compare to village without IPs. This implies that the information sharing among village IPs to other non IP village is low. Moreover, in Viti and Ngulwi village respondents are slight aware of IP. This is due to presence of farmer associations in those villages enable association members to share information with members of IPs. Hence this helps to be aware of IP.

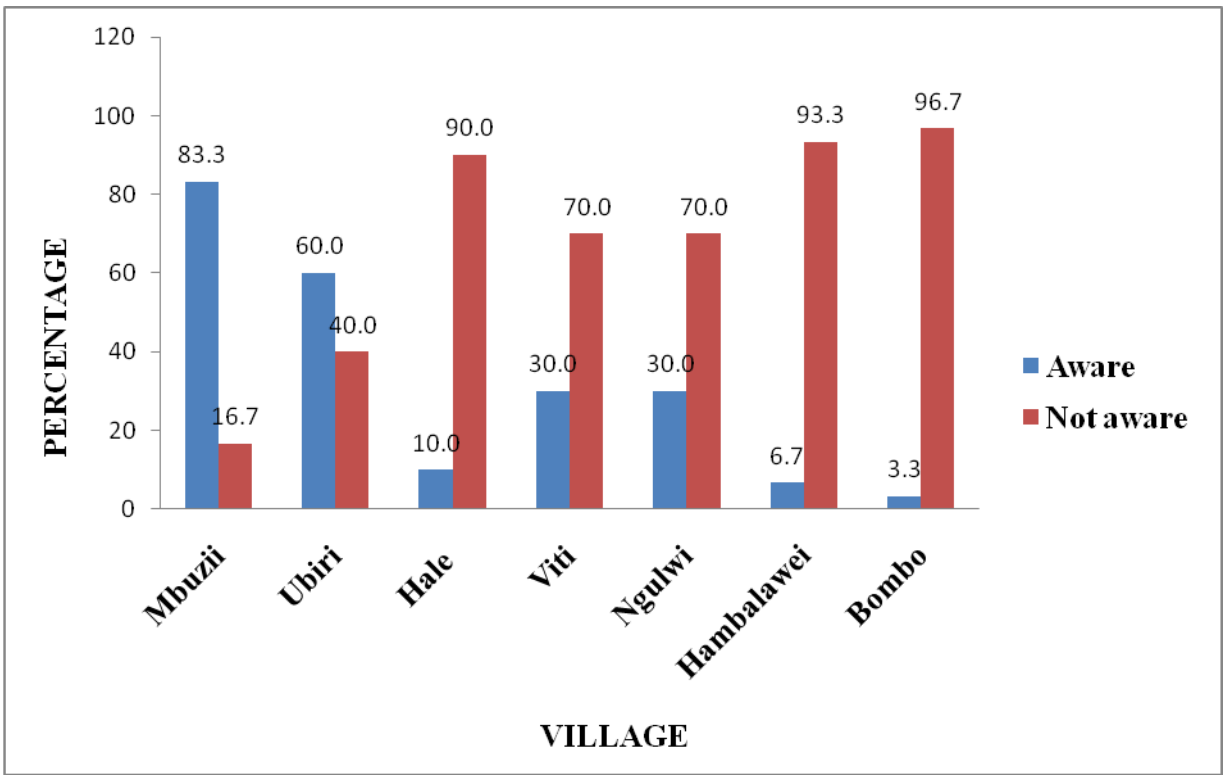

Figure 2: Awareness of innovation platform per village

Sources: Own survey data, 2016

4.2.2 Membership in association and/or innovation platform.

The results in Table 4 revealed that about 14.3% of the respondents were member of IP; while 21.0% of the respondents were member of one association or group in the village and about 64.8% of the respondents were not members of any association and IP. According to Mkurungu (2016) reported that when a farmer being a member of any association/group/ IP it help them to access agriculture inputs at low cost, access to loans/credits, access to extension services and information access. In addition to that a study by Martey *et al*. (2014) also reported that a farmer who are member of association have access to information which are crucial for production and marketing. Moreover, Makate and Mango (2017) reported that through farmers group /association, farmer expected to get encouragement, inspiration and motivation from other farmers. Therefore, based on the finding majority of the farmers are not the members of associations and IPs , this means that most of the farmers are not able to access inputs at low price, extension services, credit access, and information access.

Table 4: Membership in association and/or innovation platform (n=210)

Membership	**Frequency**	**Percentage**
Innovation platform membership	30	14.3
Association membership	44	21.0
Non – membership of association and innovation platform.	136	64.8
Total	**210**	**100**

Sources: Own survey data, 2016

4.2.3 Membership criteria of the innovation platform and association

The result from group discussions and key informants interview revealed that the main criteria for the membership of the IP (Mbuzii and Ubiri village) and farmers group in Ngulwi village is open to dairy farmers who are willingness to pay registration fees and monthly contribution fees and should be a resident of village where IP exist. For the dairy cooperatives in Hale and Viti village the membership criteria is also open to dairy farmers who are resident of the area where cooperative exist and who are able to pay registration fee and buying a share. The result is in line with Tenywa *et al*. (2013) who also reported that that criterion for the membership of IPs established in the Democratic Republic of Congo include; a member should pay a non-refundable one time registration fee and also should agree to pay monthly contribution. Based on the findings it is important for the IP and association to have

criteria for membership such as payment of registration fee and monthly contribution this will act as the sources of fund that will enable platform and association to implement its activities and generate a sense of ownership.

4.2.4 Sources of funding that enable innovation platform and association to function

Table 5 indicates that 76.7% of the respondents revealed that the main sources of fund that enable IPs to function is membership registration fee and monthly contribution fee, while 23.3% of the respondents revealed that IP obtain financial resources from non-governmental organization (NGO's) and international development project. Based on the findings from group discussions and key informants interviews the main sources of funding reported that enable IPs to implement its activities is the membership registration fee and monthly contribution fee. For example in Mbuzii village and Ubiri village were IP exist it was reported that monthly fee per month is 1000/= TSh and membership registration fee is 2000/= TSh. The result was consistent with Tukahirwa *et al*. (2013) who reported that Bubare IP in Uganda has registration fee which range between 1000/=USh to 5000/=USh and monthly contribution of 1000/=USh. Moreover, a study by Schut *et al.* (2017) revealed that one of the main sources of fund for the IP is membership contribution while other external sources may include; government support, private sector support and non-governmental support. However, for the sustainability of the platform Makini *et al*. (2013) proposed that fund for IP should come from business activities that initiated by the platform members. This will enable platform members to obtain enough fund to implement its activities for future without depend much on other external sources.

Table 5 also revealed that 84.1% of the respondents mentioned that membership registration fee and monthly contribution fee are sources of the fund that enable farmers' association to run its activities while 15.9% of the respondents mentioned that non-governmental organization and international organization project are the sources of the fund for the farmers' association. Moreover, the findings from the key informants interview and focus groups discussion also revealed that the main sources of fund that enable farmers associations to implement its activities is membership fees. In Ngulwi village where there is farmer association it was reported that Contribution fee per month is 500/=TSh and membership entry fee is 2000/=TSh. In Hale where there is farmer cooperative it was reported that monthly contribution fee is 500/=TSh and a new member should purchase a share at amount of 10 000/=TSh. While in Viti village where there is farmers' cooperative it was reported that

monthly contribution fee is 20 000/=TSh and one share is 10 000/=TSh whereby a new members is supposed to buy 3 share at amount of 30 000/=TSh. A share is amount of money that an association member invest in the association in order to obtain profits through getting loans while fee is the amount of money that an individual contribute in order to be a member of the association or innovation platform. Therefore, the membership fees, monthly contribution and share should be continued encouraged in the IPs and associations. Furthermore, it is important for association members and platform members to initiate business activities that will act as the sources of income to the platform and association and capacity building to the platform members and association members on how to write proposal to attract fund from public and private development sector.

Table 5: Sources of fund of the innovation platforms and association

	Innovation platforms		Associations	
Sources of fund	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Membership registration fee and monthly contribution fee	23	76.7	37	84.1
Non-governmental organization and international organization project	7	23.3	7	15.9
Total	**30**	**100**	**44**	**100**

Sources: Own survey data, 2016

4.2.5 Formalization of the innovation platforms and associations

The findings from revealed that both Mbuzii IP and Ubiri IP are operated formally. The formalization aspects that were reported include; registration of the platform and presence of constitution which guide activities of the platform, existence of governance structure and sub-committees. In term of registration it was reported that Ubiri IP was registered with the department of community development in Lushoto district as Ubiri dairy farmers association (Umoja wa wafugaji ng'ombe Ubiri) while Mbuzii IP was registered as Bahati farmers group (Kikundi cha bahati). In addition to that it was reported that both IPs has governance structure which composed of chairman, secretary and treasurer. Beside these officials it was also reported that both IPs are organized into five sub-committees which are; animal feeding committee, animal husbandry training committee, animal shed committee, diseases committee, quality breed and market committee. On constitution aspect both IPs in Mbuzii and Ubiri have constitution which guide the activities of the platform members. This result

line with Nederlof *et al*. (2011b) who revealed that formalization process it enable platform to gain outside recognition and get legitimacy to represent group of people. For example Makini *et al*. (2016) show out that registration of Bungoma South farmer's IP in Kenya has attracted recognition by the county government. Moreover, Tukahirwa *et al*. (2013) reported that Bubare IP in Uganda was registered as a community based organization in order to get support from local government.

With regard to the farmers' association it was reported that in Ngulwi village there is farmers' association which was registered as Ngulwi dairy farmers group (also known as Umoja wa Wafugaji Ngulwi- UWANGU in Swahili) by district community development department. While in Viti and Hale village there is dairy farmer's cooperatives. In Viti village dairy farmers cooperative was registered as Shume dairy farmers cooperative (Ushirika wa Wafugaji Shume- UWASHU") and in Hale village dairy farmers cooperative was registered as Hale Dairy Farmers Cooperative ("Ushirika wa Wafugaji Hale- UWAHA"). Both cooperatives were registered by district cooperative department and it has organization structure and constitution that guide the activities of the associations. According to government regulations, all cooperatives are supposed to be registered by district cooperative department while farmers groups are supposed to be registered by district community department as in absence of guiding government regulations pertaining to IP's operations, they cannot be registered as a platform but it can be registered as any other form of organization and operate as platform that is why the existing IPs were registered as farmers groups by district community development department.

4.2.6 Expectation of the dairy farmer's participation in the innovation platforms and associations

Table 6 indicates that 57.1% of the respondents state that their expectation following their participation in IP is to gain knowledge and skills on animal husbandry, 28.6% of the respondents they expect to obtain improved dairy cattle, 11.4% expect to obtain better price of milk and market and 2.9% of the respondents expect to obtain credit from platform. The table 6 also shows that 36.4% of the respondents revealed that their expectation from participate in the associations is to obtained improved dairy cattle while 27.3% their expectation is to gain knowledge and skills on animal husbandry, 18.2% their expectation is to obtain better price of milk and market, 12.7% their expectation is to obtain credit, 3.6% interact with other people and exchange ideas and 1.8% their expectation is to obtain inputs.

It is important for dairy farmers to acquired knowledge and skills on animal husbandry and to have improved dairy cattle because they have significant contribution towards improving their production.

Table 6: Expectation of farmer's participation in the innovation platforms and associations

Expectation	Innovation platforms		Associations	
	Frequency	Percentage	Frequency	Percentage
Obtained improved dairy cattle	10	28.6	20	36.4
Better price of milk and market	4	11.4	10	18.2
Gain knowledge and skills on animal husbandry	20	57.1	15	27.3
Obtained credit	1	2.9	7	12.7
Obtained inputs	-	-	1	1.8
Interact with other people and exchange ideas	-	-	2	3.6

Sources: Own survey data, 2016

4.2.7 Expectations being met from the participation in the innovation platforms and associations

Results from Table 7 below indicate that 53.3% of the respondents revealed that their expectations from participation in the IPs have been met while 46.7% of the respondents indicate that have not met their expectations from participation in the IPs. Table 7 also indicates that 63.6% of the respondents state that their expectations from participation in the associations have been met and 36.4% of the respondents reported that they have not met their expectations from participation in the associations. Farmers' expectation can be achieved when farmers themselves work closely with their organizations that bring together all players such as farmers' cooperatives, farmers groups and IPs. All those farmers' organizations have ability to enable farmers achieve their expectations by address their respective interest.

Table 7: Expectations being met from the participation in the innovation platforms and associations

	Innovation platforms		Associations	
	Frequency	Percentage	Frequency	Percentage
Yes	14	46.7	28	63.6
No	16	53.3	16	36.4

Sources: Own survey data, 2016

4.2.8 Benefits obtained from the innovation platform and / or farmers' association

The findings in Table 8 below, showing that about 71.8% of the respondents mention access to trainings on animal husbandry has benefits from IPs. Other benefits mentioned by respondents include: improving social network and relationship (7.7%); access market (12.8%); access inputs (2.6%) and access to credit (5.1%). This finding is consistent with Dusengemungu (2011) who also reported that, IPs in Rwanda has benefited farmers through access to technology, access to new markets, social network and relationship and knowledge and skills. Another study done by Mkungura (2016) in Kilombero district also revealed that IPs benefited farmers to exchange information in marketing, opens market opportunities for agriculture produce and strengthening farmers skills to address their challenges.

Table 8 below also revealed that about 44.2% of the respondents mentioned access to trainings on animal husbandry practices was the benefits obtain from farmers association. This is followed by access to market mentioned by 31.2% of the respondents; improving social network and relationships mentioned by 13.0% of the respondents; access to agriculture inputs mentioned by 3.9% of the respondents and access to credit mentioned by 7.8% of the respondents. This result was consistent with the findings by Nyang *et al.* (2010) who reported that in East Africa farmers organizations/associations has enable farmers access market information, value addition to their products, collective marketing, knowledge and skills, technical advice on crop husbandry for production and policy advocacy.

Table 8: Benefits obtained from innovation platform and association

Benefits	Innovation platforms		Associations	
	Frequency	Percentage	Frequency	Percentage
Access to training on animal husbandry	28	71.8	34	44.2
Access to market	5	12.8	24	31.2
Improving social network and relationship	3	7.7	10	13.0
Access to inputs	1	2.6	3	3.9
Access to credit	2	5.1	6	7.8

Sources: Own survey data, 2016

4.2.9 Communication and information sharing among innovation platform members

Table 9 summarizes the respondents views regarding sharing of knowledge and/or information about dairy production with other stakeholders in the IP that 46.7% of the respondents strong agree, 26.7% agreed, 13.3% undecided, 10.0% disagree and 3.3% strong disagree. The table also shows 43.3% of the respondents strong agree with the statement that extension agents provide information that is relevant to my needs, 33.3% agree with statement, 13.3% disagree with statement and 3.3% strong disagree with statement. This finding implies that majority of dairy farmers share knowledge or information with stakeholders in the IP and also extension agents provide information that is relevant to their needs. This finding is in line with Makate and Mango (2017) who reported that access to extension services is important sources of information to the farmers and also extension agents are the one who enhance linkage between farmers and research.

Moreover, 50.0% of the respondents strong agree with the statement regarding members satisfaction with the IP's communication, 36.7% agree with statement, 10.0% disagree with statement and 3.3% strong disagree with statement. Victor *et al*. (2013) demonstrated that communication in the IP help to bring together platform members together to identify their common objectives, manage information, and ensure that all members of the IP their voice is heard. Therefore, based on those results it implies that platform members communicate and share information about dairy production activities. This is further supported by Bachhav (2012) who argues that information sharing in agriculture sector improve productivity through enable farmers to access information on weather trends, market access of the products, and best farming practices.

Table 9: Communication and information sharing among innovation platform members

Statement	Strong agree	Agree	Undecided	Disagree	Strong disagree
I usually share knowledge /information about dairy production with other stakeholders in the IP	46.7%	26.7%	13.3%	10.0%	3.3%
Extension agents usually provide information that is relevant to my needs	43.3%	33.3%	0.0%	13.3%	10.0%
I satisfied with the communication I have with IP members	50%	36.7%	0.0%	10.0%	3.3%

Sources: Own survey data, 2016

4.2.10 Joint planning, coordination and trust among innovation platform members

The results in Table 10 below indicate that majority of the respondents (50.0%) are undecided with statement that I usually attend planned periodic meetings of stakeholders to discuss the common dairy production and market problems, 23.0% agree with statement, 13.3% strong agree with statement, 6.7% disagree with statement and 6.7% strong disagree with statement. In addition with the statement that I usually planned my activities according to the activities of the IP in table 10 below indicate that 53.3% of the respondents strong agree with statement, 23.3% agree with statement, 6.7% undecided with statement ,10.0% disagree with statement and 6.7% strong disagree with statement. Besides, on the statement that I and my partners in the IP we plan activities together in table 9 show out that 43.3% of the respondents strong agree with statement, 40.0% agree with statement, 10.0% undecided with statement, 3.3% disagree with statement and 3.3% strong disagree with statement. The findings give impression that majority of the respondents plan their activities according to the activities of the platforms, plan activities together with other platform members and majority of the respondent's undecided whether they usually attend or not attend plan periodic meetings of the platform.

Table 10 also revealed that 37.9% of the respondents strong agree with the statement that, value chain actors in the IP exchange information about on-going activities, 13.8% agree with statement, 13.8% undecided with statement, 17.2% disagree with statement and 17.2% strong disagree with statement. On the statement which state that my views are taken into account by other IP members during the meetings result in table 9 indicate that 63.3% of the respondents strong agree with statement, 26.7% agree with statement, 6.7% undecided with statement, 3.3% disagree with statement and 0.0% strong disagree with statement. Furthermore, with the statement state that, I have greater trust with other IP members in table 9 revealed that 63.3% of the respondents strong agree with statement, 20.0% agree with statement, 13.3% undecided with statement, 3.3% disagree with statement and 0.0% strong disagree with statement. Taye *et al*. (2015) had claimed that trust among platform members is the one of the factors that sustains IP. In addition, Brouwer *et al.* (2016) argues that without trust among the platform members it be difficult to reach agreement.

Table 10: Joint planning, coordination and trust

Statement	Strong agree	Agree	Undecided	Disagree	Strong disagree
I usually attend planned periodic meetings of stakeholders to discuss common dairy production and market problems	13.3%	23.3%	50.0%	6.7%	6.7%
I usually plan my activities according to the activities of the IP	53.3%	23.3%	6.7%	10.0%	6.7%
I and my partner in IP we plan activities together	43.3%	40.0%	10.0%	3.3%	3.3%
Value chain actors in IP exchange information about on-going activities	37.9%	13.8%	13.8%	17.2%	17.2%
My views are taken into account by other IP members during the meetings	63.3%	26.7%	6.7%	3.3%	0.0%
I have greater trust with other IP members	63.3%	20.0%	13.3%	3.3%	0.0%

Sources: Own survey data, 2016

4.2.11 Market access, credit access and input access among innovation platform members

The results in Table 11 indicate that 53.3% of the respondents strong disagree with the statement that I satisfied with the price of milk I get from customers, 23.3% just disagree, 13.3% undecided, 6.7% strong agree and 3.3% agreed with the statement. This implies that majority of the respondents are not satisfied with the price of milk in the market. The table also revealed that 26.7% of the respondents undecided with the statement that I have access to milk market information, 23.3% strong disagree with statement, 20.0% disagree with statement, 16.7% agree with statement and 13.3% strong agree with statement. Moreover, 36.7% of the respondents strong disagree with the statement that my income from dairy activities improved, 26.7% agree with statement, 16.7% undecided with statement, 13.3% disagree with statement and 6.7% of the respondents strong agree with statement. With the statement that I face challenges in accessing milk market result indicate that 30.0% of the respondents strong disagree with statement, 26.7% disagree with statement, and 26.7% agree with statement, 10.0% strong agree with statement and 6.7% undecided with statement.

The findings also show that 53.3% of the respondents strong disagree with the statement that I usually negotiate market prices of milk among IP members, 16.7% agree with statement, 10.0% disagree with statement, 10.0% undecided with statement and 10.0% strong agree with statement. The result with statement that I have adequate milk marketing skills revealed that 3.3% of the respondents strong agree with the statement, 3.3% agree with statement, 13.3% undecided with statement, 40.0% disagree with statement and 40.0% strong disagree with statement. Majority 43.3% of the respondents strong disagree with the statement that through IP I have been able to obtain credits, 23.3% agree with statement, 13.3% disagree with statement, 10.0% strong agree with statement and 10.0% undecided with statement. Furthermore, the findings from the statement that, through IP I have easily accessed dairy inputs revealed that 40.0% strong disagree with statement, 30.0% disagree with statement, and 13.3% agree with statement, 13.3% undecided with statement and 3.3% of the respondents strong agree statement**.** Makate and Mango (2017) reported that Balaka IP in Malawi has achieve to improve income activities of farmers participate in IP, improved access to credit, improved access to input and output, improved market information and improved market access through linking farmers to markets by bringing government and private marketing institutions. In addition Balaka IP has organizing farmers and enable them

to negotiate with banks, promoting local saving among farmers, this improves saving in the IP and credit access. Therefore based on this result it was observed that IPs in Lushoto district has failed to link farmers with input suppliers, financial providers and negotiate market price of the milk.

Table 11: Market access, credit access and input access among platform members

Statement	Strong agree	Agree	Undecided	Disagree	Strong disagree
I satisfied with the price of milk I get from customers	6.7%	3.3%	13.3%	23.3%	53.3%
I have access to milk market information	13.3%	16.7%	26.7%	20.0%	23.3%
My income from dairy activities improved	6.7%	26.7%	16.7%	13.3%	36.7%
I face challenges in accessing milk market	10.0%	26.7%	6.7%	26.7%	30.0%
I usually negotiate market prices of milk among IP members	10.0%	16.7%	10.0%	10.0%	53.3%
I have adequate milk marketing skills	3.3%	3.3%	13.3%	40.0%	40.0%
Through IP I have been able to obtain credit	10.0%	23.3%	10.0%	13.3%	43.3%
Through IP I have easily accessed dairy inputs	3.3%	13.3%	13.3%	30.0%	40.0%

Sources: Own survey data, 2016

4.3 Challenges facing innovation platforms in the study area

This section presents the major results with respect to the study's specific objective two. The section has been organized into main areas known as major challenges facing IPs and ways to address those challenges as presented in sub sections 4.3.1 and 4.3.2, respectively.

4.3.1 Challenges facing innovation platforms

The results summarized in Table 12 below, reveal that the challenges facing IPs are; low milk price (23.7%); dropout among the members (15.3%); lack of bull and artificial insemination services for breeding (13.6%); lack of milk market (11.9%); low attendance among the members in the meetings (10.2%); lack of access to credit (6.8%); low milk production (6.8%); high price and unavailability of inputs (5.1%); lack of understanding IP concept (3.4%); as well as insufficient of fund to run platform activities (3.4%). These results agree with that of Mulema and Mazur (2015) who reported that lack of proper understanding IP concept and lack of funds to implement platform activities are challenges facing IP. In addition to that a study done by Mkurungu (2016) and Faysse (2006) also reported that lack of fund and low attendance was the challenges facing IP. Low attendance is influenced by poor representative of the group, lack of financial means to participate in the meetings and power imbalance among the members. Moreover, Ayantunde *et al.* (2013) reported that participation in the IP meeting became strong when the interests of actors are addressed by the platform.

Based on the findings the major challenge that was reported by many respondents was low milk price. For example in Ubiri village it was reported that one litre of milk is sold to trader at amount of 500/=TZS. In Mbuzi village and Ngulwi village it was reported that one litre of milk is sold to trader at amount of 600/=TZS. While in Viti village one litre of milk is sold to the milk collection center at amount of 600/= TZS and in Hale village it was reported that one litre of milk is sold to the milk collection center at amount of 675/ = TZS which is low compared when they sell milk to hotel and restaurant at amount of 1000/= TZS per litre. This result is line with Wassena *et al*. (2015) who reported that in Lushoto district the price of milk is low because milk collection centers monopolize the market of the milk and also are the one who control the price milk in the area.

Table 12: Challenges facing innovation platforms (n=30)

Challenges	Frequency	Percentage
Low milk price	14	23.7
Dropout among the members	9	15.3
Lack of bull and artificial insemination services for breeding	8	13.6
Limited access to market	7	11.9
Low attendance among the members in the meetings	6	10.2
Low milk production	4	6.8
Lack of access to credits	4	6.8
High price of inputs and unavailability	3	5.1
Lack of understanding IP concept	2	3.4
Insufficient fund to run platform activities	2	3.4

Sources: Own survey data, 2016

4.3.2 Proposed ways of addressing challenges facing innovation platforms

The result from Table 13 below revealed some of the solutions suggested by the respondents to address the challenges face IPs. About 20.0% suggested that provision of the best bull for breeding; 14.5% of the respondents suggested that assured milk market; 12.7% suggested that study tour and trainings on animal husbandry should be provided; 12.7% suggested that price of milk should be increased to reflect the cost of keeping dairy cattle; 12.7% of the respondents suggested that artificial insemination services should be provided to the farmers; 5.5% suggested that government and non-governmental organizations should provide financial support to the platform; 5.5% suggested that trainings concerning IP should be provided; 5.5% suggested that linking IP with input suppliers in order to enable them to access inputs and 1.8% suggested that linking credit providers with platform. When those proposed measures implemented it will help to address the interests of dairy farmers, enhance dairy productivity and improve livelihood of the dairy farmers. Moreover it will increase farmers and other actor's participation in the IPs and contribute to the sustaining it.

Table 13: Proposed ways of addressing challenges facing innovation platforms

Solution of the challenges	Frequency	Percentage
Study tour and trainings on best animal husbandry practices	12	12.7
Provision of the best bull for breeding	11	20.0
Assured milk market	8	14.5
Price of milk should be increased to reflect the cost of production	7	12.7
Artificial insemination services should be provided	7	12.7
Government and Non-governmental organizations should Provide financial support to the platform	3	5.5
Linking platform with input suppliers	3	5.5
Trainings concerning innovation platform	3	5.5
Linking Platform with credit providers	1	1.8

Sources: Own survey data, 2016

4.4 The assessment of sustainability of the innovation platforms in the study area

The third specific objective on assessment of sustainability of the IPs was addressed by two main components known as key sustainability indicators and potential stakeholders along the dairy value chain. The first components (presented as Section 4.4.1) assessed and discussed eleven key indicators of the sustainability of IP which are: structure, composition, legislative in-terms of policies, law and governing procedures, relationship among players including trust, operationalization in terms of meeting schedule and attendance, communication flow, funding , support services such as research and development, extension and marketing, market structure in terms of demand, supply, pricing and competition as well as cross cutting issues such as environment and culture. All these indicators were assesses using SWOT analysis in order to establish actual and desirable environment required both inside (internal) and outside (external) of the IP. In addition to that, the second components (presented as Section 4.4.2) assessed and characterize the key stakeholders that are required for the IP to sustain. This study identified type of stakeholders, their core interest, their roles, their extent of interaction among themselves and other players outside the IP. Moreover, other issues assessed in this section include the impact and influence of each stakeholder in the dairy value chain.

4.4.1 Key indicators and respective SWOT analysis

SWOT analysis was done to assess the sustainability of the IPs. The strengths, weaknesses, opportunities and threats of the IPs were identified based on the focus groups discussion with platform members and key informants interview (Table 14).

(i) Strengths

The major IP strength identified include; a good and well defined organization structure, presence of constitution, rules and regulations that guide the interaction of actors and activities of the IPs as well as existence of sub -committee within the leadership structure. The findings are in line with Nederlof *et al.* (2011) that the formality of the platform should involve the existence of rules, regulations and structure that guide interaction among the actors. Other strengths identified include availability of farmers and farmer's associations, trust among the members as well as gender balance in IPs management team. Findings revealed that the availability of farmers and their associations enables members to organize themselves and thus be able to derive benefits from the IP. Besides, success and sustainability of the dairy IP requires trust among members in all activities and decision-making process. This is also supported by Kusters *et al.* (2017) who argue that lack of trust among the stakeholders in the platform will lead to lack of transparency and commitment among the members. The gender balance within the leadership of IP will also ensure that all gender groups are reached and engaged accordingly assuring the sustainability of the platform.

Additionally, it was established that through IPs dairy farmers have been able to access training on animal health, feeding and production. Our findings have also established that IPs have well-defined requirements and procedures in their constitution for a new member to join. Such requirements include possession of dairy cattle together with the agreed membership and registration fees. Furthermore, another identified strength of the platforms is good information flow and communication among members such that exchange of information among the members of the platform about what is going on in the platform is effective. Findings revealed that communication and information flow is aided by periodic meetings of the members that are usually planned according to their constitution, availability of farmer's organizations and availability of dairy farmers. Regular meeting is the key tool that brings platform members together to identify their common objectives, clarify the agenda, share knowledge and facilitate discussion among the actors in the platforms. As

supported by Victor *et al.* (2013) clear communication within the IP enhances learning among IP actors, enables engagement and dialogue among the members and documentation of activities of IP and outreach to other community members. The strengths details are summarized in Table 14.

(ii) Weaknesses

The most identified weakness that could endanger achievement of sustainability of dairy IPs is funding. Across the board, insufficient fund for IP to function smoothly, lack of access to credit and reluctance of some IP members to contribute membership fees were highlighted as the outstanding factors behind the funding challenge. Most of the IP members are not willing to contribute fees that could be used to implement platform activities due to slow realization of their personal and group financial expectations. This makes it difficult for the platform to achieve its set objectives. The findings are in line with Pyburn and Mur (2014) who reported that funding is the most critical resources required by IPs in order to implement their activities. Funding can be obtained through charging participation fees from the members and income obtained from other business activities initiated by the platform members. Likewise, Makini *et al*. (2013) demonstrated that membership fees is the one of the source of the IP revenue that enable the platform to implement its activities. For that reasons members of the platforms should be motivated and facilitated to contribute their fees so that it can enable the platform to be in operation and to be sustainable.

Moreover, lack of access to credit and affordable agricultural inputs was also identified as the weakness of the platforms. This is mainly attributed to poor link to financial providers and missing of the input suppliers as core stakeholders in the IPs. Additionally, low attendance among members was also observed as contributing to weakness of the IP and hence a major barrier to the planning of the platform activities because the meeting quorum might not be reached thus limiting some decisions which need a certain level of majority. This also jeopardizes implementation of the agreed decisions as majority won't be able to execute and or support the decisions. Apart from that, drop out among members, unfollowed meeting schedules as well as missing of some key actors in the platform was also seen as the weakness of the existing IPs. Regular meetings and stakeholders attendance in the IP is very important because it is a place where platform members discuss and plan their activities (Makini *et al.,* 2013). To overcome these weaknesses IPs need to fulfill stakeholder's

expectations in order to encourage stakeholder's attendance in the IP meetings and avoid dropout rate.

Another weakness is regular conflicts and misunderstandings between IP leaders and members which affect the activities of the platform because some of the stakeholders do not cooperate with other actors to implement activities of the platform. According to Boogaard *et al.* (2013) conflicts in IPs usually occur due to either individual power struggle, individual struggle over interest or relationships struggle. These situations could be settled through negotiations done outside the platform meeting. Thus, misunderstandings between leaders and or members must not be allowed, rather worked upon for sake of IP's sustainability. Other identified weaknesses include; low milk production and price which were associated with a number of factors such as poor feeding, animal diseases and lack of proper training. These bottlenecks can be tackled collectively within IPs to enable their smoothly operation. The details of weaknesses are summarized in Table 14.

(iii) Opportunities

Various opportunities were identified including the existence of input suppliers within the study area, if well utilized these suppliers will be useful in addressing the weaknesses of limited access to agricultural inputs. This is supported by Fatunbi *et al*. (2016) with the argument that input suppliers are the one of the key actors in the IPs to guide the availability of inputs to the farmers. This will help farmers to improve their production because they can access whatever inputs required and at reasonable price. Furthermore, existence of financial institutions was identified as one of the opportunities because it can be used to overcome the weakness of lack of access to credit. These credit providers must be invited into the IPs and urged to ensure that members especially farmer's access credit at reasonable interest rates. When farmer's access credit it enables them invest more in their activities including purchase of inputs that will improve production.

In addition to that, presence of research institutions and extension agents both at village and district levels was also identified as opportunities. Those opportunities can be capitalized to address the challenge of low milk production by means of providing best animal husbandry training to the farmers, conducting research on how to improve production of farmers and advising the farmers to adopt technology that will improve production. This could be done by engaging research institutions and extension agents with similar interest to the IPs through

community action research programs. Examples of such institutions are the Nelson Mandela African Institution of Science and Technology (NM AIST), Sokoine University of Agriculture (SUA), Mzumbe University (MU) and Tanzania Livestock Research Institute (TALIRI), these institutions have research agendas on IP and dairy development as well as they possess supporting facilities like outreach programs, incubation and living laboratories to support farmers and other actors within the dairy value chain. The details of various opportunities are summarized in Table 14.

(iv) Threats

The most identified factors outside the organization that are unfavorable for achieving the objectives of dairy IP and farmers associations is high cost of borrowing and high interest rates imposed by financial institutions like banks which limit stakeholders particularly farmers to lend credit. This may be mitigated by members establishing their own SACCOS or community banks within the IP while working towards reaching banks requirements and standards. Findings also identified socio-cultural barriers as one of the weaknesses towards sustainability of dairy IPs. Socio-cultural barriers which are influenced by cultural practices of the community led to occasions that women are not expected to speak out in meetings and when elders make a decision those decisions are final and should not be questioned. Despite that these threats are getting less and less common, they have huge effect in terms of decision making process and planning process of the platform as some of the decisions need voices of other groups like women and youth for the viability of the platform. The best way to minimize social and cultural barriers is through bringing gender issues into mainstream of the IP. According to Chiuri *et al.* (2015) mainstreaming gender in the IP it is important because it ensures the needs, interest and challenges of men, women and youth are included and addressed.

Drought is another identified threat to the platform because it affects the production and livelihood of the farmers. To mitigate this IPs need to be well strengthened and be inclusive of more actors such as researchers, extension agents and other advocacy groups. Besides, the issue of drought can be dealt in the form of environmental conservation and various solutions towards effects of climate changes. In addition to that, unstable milk price is another threat that limits farmers to obtain income. This is because the price of the milk is always low compared to the cost of keeping dairy cattle, without collective effort to address it this problem will continue persisting. Lobbying and advocacy through IP will bring more impact

than it would if individual farmers worked separately. The details of threats are summarized in Table 14.

Table 14: SWOT analysis matrix towards sustainability of innovation platforms in Mbuzii and Ubiri village in Lushoto district, Tanzania

Strengths	Weaknesses	Opportunities	Threats
(i) Availability of dairy farmers (ii) A good and well define management structure of the IP (iii) Presence of constitution, rules and regulations that guide the activities of the IP (iv) There is trust among IP members. (v) Management team of IP is composed both female and male. (vi) Through IP farmers have been able to access training on animal health, feeding and production (vii) There are a well-defined criteria/ requirements and procedures in constitution for a new member join in IP. (viii) Members' fee per month and registration fees is the main source of fund that enables IP to function. (ix) There is information flow and communication between members of IP (x) There are periodic meetings of the members that have been planned according to their constitution. (xi) Availability of farmers organizations and associations e.g. Shume dairy farmers cooperative, Lushoto dairy farmers cooperative and Ngulwi dairy farmers group	(i) Missing of some key actors in the IP such as credit providers and input suppliers. (ii) Insufficient fund to run IP effectively and efficiently (iii) Some of the meetings schedules of IP members are not followed (iv) Low attendance among IP members in the scheduled meeting (v) Dropout among IP members (vi) Lack of access to credit among IP members (vii) Misunderstanding between IP leaders and members. (viii) Lack of access to affordable agricultural inputs among IP members (ix) Low milk price example in milk collection center the price ranges between 500 & 650/=TZS per litre as compared to restaurant and hotels were price of milk is 1000/= TZS per litre (x) Low milk production among the members of IP. (xi) Reluctant of some IP members to contribute membership fees.	(i) High demand of milk due to presence of milk collection centers, restaurants, kiosk and hotels and dairy processing industry at regional level. (ii) Presence of input suppliers which can supply agriculture inputs to dairy farmers. (iii) Availability of extension officers at village ward and district levels that can advise and support dairy farmers activities and they can be one of the IP actor. (iv) Existence of national policy and regulation that support dairy activities and farmers group organization (v) Presence of various developmental interventions that support dairy farming in the district level. (vi) Presence of financial institution that can enable to ensure access to credit among the IP members. (vii) Presence of research institution that can enable to provide training to dairy farmer and can be also the actor of IP (viii) Presence of livestock department, agriculture department, cooperative department and community development department that support dairy farming and farmers groups organizations as a strong pool of available technical and indigenous knowledge of dairy sector	(i) Unstable milk price in the market, (ii) Socio-cultural barriers, (iii) Drought, (iv) High cost of borrowing and high cost of interest among borrowers

Source: Own survey data, 2016

4.4.2 Stakeholders identification and characterization

In an effort to ascertain sustainability of IPs, diverse actors from the dairy value chain were identified, assessed and characterized based on their interest, roles extent of interaction, impact and influence in the dairy value chain for the sake of co-finding solution to the challenges. Key actors identified are: farmers and farmers' organizations, input supply, credit providers, extension service providers, local government officials, milk traders, milk transporters and processors, researchers, non-governmental organizations and policy makers.

The findings show that when each actor involved in the platform play specific role in co-finding solutions to the problem the strength and sustainability of IPs will then be assured. For instance, farmers and farmers organizations with their interest of securing access to training on animal husbandry practices, access to credits at low interest rate, access to affordable inputs and access to collective market work together they will be motivated to pay all statutory fees and attend meetings with a goal to solve their existing challenges jointly with other actors. With this collective attitude, they will always require a platform by which to bring together diverse actors to safeguard their common interests. Similarly Birachi *et al.* (2013) stated that the existence of the IP enables farmers to organize themselves into groups to sell their products at better prices, learning marketing skills and access credit which they can use to purchase inputs for production purpose and therefore increase their production and productivity. Moreover, based on their interest and role, their impact and influence in the IP will increase as well as improve the interaction with other stakeholders in the platform.

With regard to the input suppliers their main interest is the earned profit from the sale of the inputs to the farmers, thus their presence in the platform will assure supply of inputs to the farmers at the affordable price after negotiation between farmers and input suppliers within the IP, in turn input suppliers are assured of the market for their supplies. When farmers access inputs at affordable prices it motivates them to continue engaging in the platform and improve their production. Therefore the role of the input suppliers in the IP is to understand what kind of input farmers need and in which places farmers need inputs, and thereafter take the action of supplying it to the farmers as revealed by Fatunbi *et al.* (2015). In addition to input suppliers, sustainability of dairy IPs need also reliable credits providers who fulfill their roles of issuing credit and loans to the actors with expectations of obtaining profits in return. It is expected that the acquired credit will enable farmers to purchase inputs which will be used for production. Therefore, regular interaction between IP members, input

suppliers and credit providers must be maintained in order to ensure high impact and desirable influence within the IPs and dairy value chain in general.

Apart from that, extension services providers and local government officers are interested to see that the farmers improve their productivity and their livelihood, but their main role is to provide technical assistance to the farmers and also encourage farmers to adopt technologies that will improve their production. The findings revealed that extension agents are crucial members in the IPs and their interaction with farmer is regular because most of the time they work with farmers and support them through issuing of professional advice and technical support on animal husbandry production and management. With these roles extension and local government officers have high influence and impact in the IPs.

On the context of research and development, the core interest of researchers is to develop new ideas and solutions or technology that will solve farmer's problems and increase productivity and their main role is to ensure that the technological solutions and innovations on the platform are relevant to the need of the users. Besides, research institutions have high impact and influence in the IP because of their role of facilitation of interaction among the actors, provision of technical support like capacity building to the farmers and other actors, undertaking of research for the purpose of understanding the challenges facing farmers and coming up with the solutions of the challenges. Based on their role they will be regularly interacting with other members in the IP. According to Makini *et al*. (2013) the interest of the researchers and extension agents is to ensure technologies and innovations in the platform are relevant to the need of the farmers and make sure that farmers adopt and utilize them for the aim of improving the production. Their presence enables other stakeholders identify the real challenges and co-find solutions for the problems facing dairy farmers within and outside the IPs. Besides, non-governmental organizations have interest of ensuring that farmer's livelihood is improved through provision of advocacy, capacity building and technical support.

Further to that, milk traders and milk transporters are among the key stakeholders within the dairy IPs highly interested in accessing more milk and earning more income from selling milk. Besides, they have a role in dairy value chain to purchase milk from farmers and sell it to the milk collection centers. Likewise there are milk collection agents from collection centers who collect milk from traders like milk vendors and from the farmers directly and sell it to processors, and transport all milk to the factory for processing. Birachi *et al.* (2013)

pointed out that IP benefit traders and processors by assuring that they obtain large and reliable quality supply of the product that they require and also supports farmer groups because when farmers are organized, the cost of products that are obtained from the farmers will decrease. Therefore, the involvement of traders, milk collection center agents, and transporters in the platform is important because they alert other stakeholders in the platform on what quality and quantity of milk is required. Based on their role and interest in dairy value chain they will be regularly interacting with other actors thus having a high influence and impact in the functioning of the IP.

Moreover, policy makers are IP stakeholders whose key interest is to see to it that the livelihoods of the dairy farmers are improved through ensuring that activities of the platform are supported by government policies and frameworks. Policy makers have high influence and impact in IP since their presence contributes towards improvement of the value chain activities by setting policies and enacting by-laws in collaboration with other actors for the sake of regulating the dairy value chain. As explained by Fatunbi *et al.* (2016), when government authority and policy makers engaged in the platform they will make sure that no government policies are breached and learn new way of modifying policies that will address the real situation of the farmers in the value chain. This happens when they interact with different stakeholders in the platform. The details of stakeholders characterization is summarized in Table 15.

Table 15: Stakeholder identification matrix for sustainable dairy innovation platform in Lushoto district

No	Stakeholder category	Relevant stakeholder	Interest of stakeholder	Interaction	Impact	Influence	Stakeholder contribution	Strategy for engaging the stakeholder
1	(i) Smallholder farmers	(i) Selected members to implement the project (ii) People living surrounding the study sites (iii) Lushoto Community	(i) Earn income from dairy activities (ii) Access of affordable inputs (iii) Access to credits at low interest rate (iv) Access to milk market (v) Access to training on animal husbandry practices (vi) Organized into groups to get better price of their products	RI	H	H. Will have influence in practicing dairy production	(i) Identifying the problems (ii) Develop solutions to the problem (iii) Testing and evaluating the solutions (iv) Adopt and utilize the solutions in the field	(i) These are beneficiaries of the project. They will be consulted and involved in the implementation of activities.
2	Farmers organizations (i) Dairy farmers groups (ii) Farmers cooperatives (iii) Local IPs	(i) Shume dairy farmers cooperative in Shume ward. (ii) Lushoto dairy farmers cooperative in Lushoto town (iii) Mwangoi dairy farmers cooperative (iv) Dairy farmers group in Ngulwi village (v) Mbuzii dairy IP in Mbuzii village (vi) Ubiri dairy IP in Ubiri village	(i) Access to collective market (ii) Access of affordable inputs (iii) Access to credits at low interest rate (iv) Access to training on animal husbandry practices (v) Organized into groups to get better price of their products.	RI	H	H. Will have influence in practicing and ensuring dairy production	(i) Identifying the challenges facing farmers group organization (ii) Identifying the solutions to the challenges	(i) They will be consulted and involved in the implementation of activities.

No.	Stakeholder category	Relevant stakeholder	Interest of stakeholder	Interaction	Impact	Influence	Stakeholder contribution	Strategy for engaging the stakeholder
3	Input suppliers (i) Vet drug (ii) Feed (iii) Fodder and supplements	(i) Saidi Amir Pazia: (Inputs supplier Lushoto) (ii) Ismail Shekalage(Inputs supplier Lushoto)	(i) Profits earned from the sale of inputs to the farmers	RI	H	H. Will have influence in ensuring dairy farmers have access better and affordable inputs	Delivery quality and affordable inputs	(i) They will be informed and involved in the implementation of IP activities.
4	Credit providers (i) Bank (ii) Micro finance institution	(i) NMB Bank (ii) CRDB Bank (iii) SACCOS **(iv)** VICOBA	(i) Profit earned from loan interest (ii) Obtain more customers	II	M	H. They will have influence in ensuring dairy farmers access credit	Provision of credit/ or loans to the farmers	(i) They will be informed and involved in the implementation of IP activities IP
5.	Extension agents (i) Village and ward agriculture and livestock officers	(i) Sikudhani Mwameta(Ubiri Village) (ii) Anataria Kweka-(Ngulwi village) (iii) Mwajabu Zuberi Omari (Hambalawei village) (iv) Saidi Mwanyoka (Viti Village) (v) Nestory Buliba (Mbuzii village)	(i) Ensuring dairy farmers practice better animal husbandry activities and production increase	RI	M	H. They will have influence on supporting dairy production activities	Provide advice and technical support on animal husbandry practices.	(i) They will be involved in the implementation of the IP activities.

No.	Stakeholder category	Relevant stakeholder	Interest of stakeholder	Interaction	Impact	Influence	Stakeholder contribution	Strategy for engaging the stakeholder
6	Local government officials (i) District livestock officer (ii) District livestock officer (iii) District agriculture officer	(i) Mr. Elieza Moses(DALDO Lushoto District) (ii) Elizabeth Msoka(Livestock and fisheries officer) (iii) Mdoe Mbazi **(** District Agriculture officer)	Ensuring dairy farmers practice better animal husbandry activities and production increase	RI	M	H. They will have influence in support dairy activities and dairy farmer's group's organizations.	Provide advice and technical support on animal husbandry practices.	(i) They will be involved in the implementation of the IP activities
	(i) District community development officer (ii) District cooperative officer	(i) Joyce Israel **(**Acting district community development officer) (ii) Tito Kayugumya(district cooperative officer)	Ensuring functioning of farmers organizations(cooperative, association and farmers groups)	RI	M	H. They will have influence in facilitate registration dairy farmers groups	Provide contribution in strengthen farmers organizations	(i) They will be involved in the IP establishment and implementation of the activities.
7	Policy makers (i) Representative from district councilors (ii) Village leaders	(i) Village leader for each village will be selected (ii) One representative from district council	Dairy farmers livelihood improved	RI	L	**H**. They will have influence on all aspect of policy.	• Mobilize farmers • Support formulation of policies	(i) They will be consulted and involved in the IP

No.	Stakeholder category	Relevant stakeholder	Interest of stakeholder	Interaction	Impact	Influence	Stakeholder contribution	Strategy for engaging the stakeholder
8.	Traders (i) Milk traders (ii) Collection points agent.	(i) MankaKimaro: (Trader Mbuzii village) (ii) Yusuph Kingazi: (Trader Ubiri village) (iii) Omaro Hemed (Trader Mwangoi village)	(i) Access to available milk (ii) Profit earned from the sale of milk	RI	H	H. They will have influence purchase milk to the dairy farmers	(i) Purchase milk from farmers and transport to sell to the milk collection centers. (ii) Purchase milk from the farmers and milk traders.	(i) They will be informed and involved in the IP establishment and implementation of activities.
9	Transporter and processor	Agent from Tanga processing industry	(i) Access to available milk (ii) Earning profit from investing in milk transport.	RI	H	**H**. They will have influence purchase milk to the dairy farmers	**(i)** Purchase milk from milk collection centers and transport to Tanga fresh for processing	(i) Will be involved and consulted and involved in the IP activities
10	Research institutions	(i) Nelson Mandela African Institution of Science and Technology (ii) Sokoine university of Agriculture (iii) Tanzania Livestock Research Institute -Tanga	(i) Ensuring capacity building to the actors (ii) Ensuring farmers practice better animal husbandry activities. (iii) Farmers production increase (iv) Ensuring facilitation of the IP (v) Ensuring farmers increase their production and income (vi) Ensuring research is conducted. (vii) ensure farmers problems are analyzed and recommendations are provided to the farmers	RI	H	**H**. They will have influence in facilitation interaction among the actors, capacity building and conducting research	(i) Training of farmer in good animal husbandry practices (ii) Conduct research (iii) Analysis of farmer's problems and give recommendations	(i) Will be involved in the facilitation of the IP establishment and ensuring implementation of the activities.

No.	Stakeholder category	Relevant stakeholder	Interest of stakeholder	Interaction	Impact	Influence	Stakeholder contribution	Strategy for engaging the stakeholder
11	Non-governmental organizations (NGo's)	(i) ILRI (ii) CIAT	(i) Ensuring functioning of farmers organizations (ii) Ensuring farmers practice better animal husbandry practice (iii) Ensuring capacity building to the actors. (iv) Ensuring dairy farmers livelihood improved.	RI	M	**H**. They will have influence in supporting animal husbandry practices and farmers organization	Provide extension support in animal husbandry practices and strengthening farmer's organization.	(i) They will be consulted and involved in the implementation of the IP activities.

SOURCE: Survey data, 2016

NB**:** ***RI*** *= regular interaction,* ***II*** *= irregular interaction,* ***H*** *= high,* ***M*** *= medium and* ***L*** *= low*

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

This chapter presents the study's conclusion and recommendations. It divided into two main sections. The first Section (5.1) present conclusion of the study and the second Section (5.2) present the recommendations arising from the study findings

5.1 Conclusion

The study aimed at assessing sustainability of the IPs and associations among smallholder dairy farmers in Lushoto and Korogwe district in Tanzania. It was established that in the villages were IPs exist most of the respondents are aware of IP compared to those villages were IPs does not exist. Also it was found that inputs suppliers were withdraw from IPs hence this made dairy farmers who are members of the IPs to fail to obtain inputs at affordable price. Again, IPs does not linked with credits providers thus this made platforms members to fail to access credit at affordable interest.

Furthermore, both IPs and associations were registered by local government authority and have organization structure, constitution that guides the activities of the platforms and associations. However, IPs have also sub-committee which works together with organization structure to manage platforms. Both IPs and associations identified membership registration fee and monthly contribution fee are the sources of the income but most of the members are unwilling to contribute monthly fee which made platforms and associations to encounter shortage of fund to implement its activities. In addition to that the findings revealed that majority of the respondents disagree with the statement that I satisfied with the price of milk from the market. Also majority of the respondents disagree with the two statements which are; through IP I have been able to obtain credits and through IP I have been able to obtain inputs at affordable price.

In addition to that the major benefits that platform members and association members identified that they derive from IPs and associations are; trainings on animal husbandry, market access, social network and relationship, credit and inputs access. Also the identified constraints that face IPs includes; insufficient funds to run platforms activities, low meeting attendance among the members, drop out among the members, lack of understanding IP concept, high price of inputs and unavailability, limited access to market, low milk production among the members, low milk price and lack of bull and artificial insemination

services for breeding. Furthermore, from SWOT analysis it was established that sustainability of the IPs can be achieved through addressing the key issues on; sense of ownership and commitment among various actors, current and future status of funding in terms of membership fees and other sources of income as well as quantity and quality of human resources, number and types of training programs, availability and quality of the constitution, agreed rules, regular meetings, accountability, transparency, participation, good communication, coordination, good leadership, and organization structure. On top of that, dairy value chain stakeholders were identified and characterized based on their interest, role and influence in dairy value chin. The identified stakeholders include; smallholder dairy farmers, farmers organizations, inputs suppliers, extension services providers, local government officials, policy makers, traders, transporters and processors, research institutions and Non- governmental organizations.

5.2 Recommendations

Based on the findings and conclusion of this study, the recommendations that should be taken to enhance sustainability of the IPs include the following:

(i) To ensure effective participation of the stakeholders in the IP the initiator of the platform should understand the interest of each stakeholder and addressed by make sure that IP activities address the interest of each stakeholder.

(ii) Platform members and association members should be encouraged to contribute monthly fee and other contribution initiated by the platform. In addition to that awareness should be created to the platform members and associations members through trainings about importance of member's contributions to the IP and association and benefits that should obtained from participate in the IP and association.

(iii) Platform members should be trained on financial management such as how to obtained funds and ways to maintain its sources. Furthermore, platform members should be trained on how to write proposal to attract fund from government and private sectors. On top of that IP members should be trained on business development and should initiate business activities that will enable platform to obtain funds to implement its activities. Again, executive committee should be trained on leadership and facilitation skills in order to develop their capacity to manage platform. Moreover, IP members should be encouraged and trained on the ways to document all

activities implemented by the IP.

(iv) Government should support IPs and farmers associations by providing financial support.

(v) Capacity building to the actors in the platform through field days, exchange visit, trainings and workshops should be continue process and encouraged in the IP. This it helps to improve the skills of stakeholders in addressing various challenges faces them and improves productivity.

(vi) Missing actors such as credit providers and inputs supplies should be included and work with other actors in the IPs. Also research institution and extension services providers should work closely with other actors in the IP.

(vii) Government extension agents from villages were IP and farmers association does not exist should encourage farmers to form farmer's groups or farmers' association. Also government extension agents from ward and village level should make sure that they participate in the IP and farmers association meetings.

(viii) Linkages between local dairy IPs, regional dairy IPs and national dairy IP should be strengthen in order to enable higher level stakeholders at regional and national level to learn situation of dairy farmers at local level and this will help to develop a policy that will improve the situation of local people. Also linkage should be created between local dairy IPs working on the similar issues this will help IPs to share experience between each other hence this will contribute improve dairy sector and enhance sustainability of the IPs.

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APPENDICES

Appendix 1: Questionnaire for Household Interview

SUSTAINABILITY OF THE INNOVATION PLATFORMS AND ASSOCIATIONS AMONG SMALLHOLDER DAIRY FARMERS IN LUSHOTO AND KOROGWE DISTRICTS, TANZANIA

Baseline Survey tool

I. IDENTIFICATION OF THE RESPONDENT (Fill in the spaces provided*)*

Name of household……

Date of interview…… Name of the village ……

Ward…… Division……...

District…….....

A. DEMOGRAPHIC CHARACTERISTICS OF RESPONDENT.

1. Age of the household ……

2. Sex:

(i) Male ( ) (ii) Female ( )

3. Marital status

(i) Married ( ) (ii) Single ( ) (iii) Divorced ( ) (iv) Widow/Widower ( )

4. Education level

(i) Nil ( ) (ii) Primary level ( ) (iii) Secondary level ( )

(v) College level ( ) (vi) University level ( )

5. What is your main occupation?

(i) Livestock keeper ( ) (ii) Public servant ( ) (iii) crop farming ( ) (iv) Mixed Crop and livestock farming ( ) (VI) Farm labour on the other farm ( ) (vii) Not working at all ( ) (IV) others: specify……

6. How long have you been practicing dairy farming? ……. Years

7. How many people live in your home?

(i) 1-5 people ( ) (ii) 6-10 ( ) (iii) 11-15 ( ) (iv) Other specify…….

(B). Objective 1: To characterize innovation platforms/ associations and key actors along the diary value chain. (Fill in the spaces provided or tick one of the alternatives)

7. Are you aware of innovation platform (IP)?

(i) Yes ( ) (ii) No ( ) If yes mention any IP you know…….

8. Are you a member of innovation platform/ associations?

(i) Yes ( ) (ii) No ( )

If Yes who else is a member of IP/association, list them and mention their activities

……

……

……

9. If yes, what inspired you to be a member of IP/Association?

(i)To access agricultural inputs ( ) (ii) To access better market ( ) (iii) To access credit ( ) (iv)To acquired more knowledge and skills in livestock and crop production ( ) (v) To interact with other people ( ) (vi) other specify ……

4. What are your expectations from participating in the IP/Association?

……

……

10. Generally what is the purpose of your IP/Association?

……

……

11. Are your expectations being met in participating in the IP/Associations?

(i) Yes ( ) (ii) No ( )

If yes/No, explain

……

……

12. What are the criteria for joining the IP/Associations?

……

……

13. What are your sources of information in IP/Association? Who delivered information?

Type of information delivered? How information is delivered? (Use the codes below)

Sources of information	Type of information	Who passes the information to IP/Association members	How is the information delivered

Sources of information in IP/Association? (i) Government extension agent (ii) NGO Extension agent (ii) Fellow farmer but non IP member (iv) Newspaper (v) Radio (vi) Fellow IP/association member (vii) Mobile phone (xi) Other (Specify)……..

Type of information delivered in IP/Association i) Manure utilization and Planting new crop varieties ii) credit access iii) Value addition iv) Use of agricultural inputs v) Markets for produce

vi) Feeding, animal health and production (vii) other

(specify)……..

Who responsible for delivered the information from IP/Association? (i) IP Chairperson ii) IP secretary iii) member vi) IP Facilitator vii) others (Specify)……

How information is delivered in IP/Association? i) Meetings ii) Contact individual's iii) leaflets/brochures iv) Other (specify)……..……

14. Mention the most important source of information delivered to your IP/Association and ranking according to their importance

Sources of information	**Rank**

15. How often have you attended IP /associations meetings?

(i)Never attended any meetings ( ) (ii) Often attend the meetings ( ) (iii) Not so frequently

Attend the meeting ( ) (iv) Never missed any meeting ( )

16. What is the mode of decision making within the IP /Association

(i)Simple 50% majority vote ( ) (ii) Members follow the decision of their leader elder or representative ( ) (iii) Consensus among all members ( ) (iv) Consensus among different types of stakeholders represented in the IP ( ) (v) other specify……

17. Do you have any position within the IP/Associations? Yes ….. No …….

If yes which position (i) Organizer/facilitator ( ) (ii) chairperson/secretary ( ) (iii) other specify ……

18. What activity do you undertake within the IP/Association?

……

19. From the time you joined, what are the benefits from being a member of IP/Association?

(i) Access to new market ( ) (ii) Social network and relationship ( )

(iii)Access to credit ( ) (iv) Access to animal husbandry inputs ( ) (v) Access to training on feeding, animal health and production ( ) other specify ……

20. Do you have any source of funding to allow the IP/Association to function? Yes …. No ...

If Yes form which source ……

If No how do you operate? Explain ……..

21. Does IP/Association pay any staff to help in implementing some of the activities?

(i) Yes ( ) (ii) No ( ) (iii) I don't know ( )

17. Does IP/Associations have rules, regulations or by laws and constitution to govern it?

(i) Yes ( ) (ii) No ( )

If Yes which one? …….

22. How is the Information sharing, communication in IP/Association?

1=strong disagree 2=disagree 3=undecided,4=agree,5=strong agree	1	2	3	4	5
Do you usually share knowledge/information about dairy production with other stakeholders in IP/Associations					
Extension agent usually provides information that is relevant to my needs?					
Are you satisfied with the communication you have with IP/association members?					

23. Joint planning, coordination and trust. (Please tick in appropriate space)

1=strong disagree 2=disagree 3=undecided,4=agree,5=strong agree	1	2	3	4	5
Do you usually attend your planned periodic meetings of stakeholders to discuss common dairy production and market problems					
Do you usually plan your activities according to the activities of your IP/ association partners?					
I and my partners members in IP/association we plan activities together					
Value chain actors in IP/association exchange information about on - going activities					
Does your views taken into account by other IP members during the meeting					
Do you have greater trust with IP members					

24. Market access, credit access and input access. (Please tick in appropriate space)

1=strong disagree 2=disagree 3=undecided,4=agree,5=strong agree	1	2	3	4	5
Are you satisfied with the price of milk you get from your customer					
Do you have access to milk market information					
Does your income from dairy activities improved					
Do you face challenges in accessing milk markets					
Do you usually negotiate market prices of milk among IP/association					
Do you have adequate milk marketing skills?					
Through IP/Association have you easily accessed dairy inputs					

25. Who are major buyers of the milk produced?

(i)……..

(ii)……..

(iii)……..

(iv)……..

26. What is the price of milk per litre?

……

27. Are you satisfied with the price of milk?

(i) Yes ( ) (ii) No

28. Give reasons

(i)……

(ii)……

(iii)……

CONSTRAINTS FACING INNOVATION PLATFORMS

29.What are the main challenges facing your IP

……

……

……

……

……

……

30. What could be the possible solution for the above challenges face IP?

……..

……..

……

……

……

THANK YOU FOR YOUR COOPERATION

Appendix 2: Checklist for Focus Group Discussions

1. Why and how people became IP members in your area? Who initiated the idea and organized it?
2. What is the mode of operation?
    - Membership and representation
    - Governance structure
    - Meetings schedule
    - Sources of fund
    - Activities of the IP
    - Achievements/Benefits
3. What are the goals/objectives of this IP?
4. Why and how people became IP/association members in your area?
5. What are challenges/constraints that the IP/association faces at the moment?
6. In your opinion what need to be done to address those challenges and to sustain innovation platform?
7. What are the strengths, weaknesses, opportunities of this IP? and what are the threats to the sustainability of IP?
8. What are the main value chains of dairy product in this village? Who are the main actors/stakeholders?
9. What are the main challenges and opportunities of the value chain you mentioned?
10. Where are the markets for dairy products? Both input and output markets? How far are they from village? What are the main means of transport?
11. What strategies would you suggest to improve marketing activities within innovation platforms?
12. What strategies would you suggest to improve livestock production within Innovation platforms?

THANK YOU FOR YOUR COOPERATION

Appendix 3: Checklist for Key Informants Interview

1. What does the term innovation platform (IP) mean to you?
2. What are the goals/objectives of this IP?
3. Why and how people became IP/association members in your area?
4. What are the types of actors involved in the IP/Association? What are the roles of actors?
5. What is the mode of operation of the IP/Association?
    - Date of initiated and who initiate
    - Membership and representation
    - Governance system of the IP
    - Meetings schedule
    - Sources of fund
    - Activities of the IP
    - Achievements/Benefits
6. What are challenges/constraints that the IP/association faces at the moment?
7. In your opinion what need to be done to address those challenges and to sustain innovation platform?
8. What are the committees in this IP? ***Probe:*** How committees were they formed? Are there any sub committees? Size? Gender? What are the qualifications of the members? How have they evolved? How are they ruled/managed? What are the roles of each committee? Who defines the roles of the committees? How often do they meet?
9. What are the strengths, weaknesses, opportunities of this IP
10. What are threats to the IP

THANK YOU FOR YOUR COOPERATION!

RESEARCH OUTPUTS

Output 1: Review and research articles

Putaa, H., Chachage, B. and Pasape, L. (2018). Review of the factors contributing to the sustainability of the agricultural innovation platform. Int. J. Agron. Agri. Res**. 12**(5), 85-99.

Output 2: Poster presentation

SUSTAINABILITY OF INNOVATION PLATFORMS AND ASSOCIATIONS AMONG SMALLHOLDER DAIRY FARMERS IN LUSHOTO AND KOROGWE DISTRICTS ,TANZANIA.

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Introduction

Innovation platform (IP) is the forum established to facilitate interactions and learning among stakeholders selected from a commodity chain leading to participatory diagnosis of problems, joint exploration of solutions leading to the promotion of agriculture innovation along the targeted commodity chain (Adenkunle *et al*., 2010).

This study intends to collect information towards facilitation of the formation sustainable farmer's innovation platforms that are effectively linked to markets as part of university –facilitated outreach with communities. Specifically, the study characterize innovation platforms, associations and key actors along the diary value chain in the study area; identify the key constraints facing sustainability of the innovation platforms in the study area and evaluate sustainability of the innovation platforms in the study area

Methods

❑ The study was conducted in 7 villages, 1 from Korogwe and 6 from Lushoto district

❑ A sample size of 30 respondents was selected from each village which makes a total sample size of 210 respondents from 7 villages.

❑Data was collected through: Household interview, Focus group discussions and Key informants interview.

❑Quantitative data was analysed by using Statistical Package for Social Science (SPSS).Qualitative data was analysed by using content analysis.

Figure 1: Milk being delivered to the milk collection centre by smallholder dairy farmers at Viti village, Lushoto district

References

❑Adenkule A.A., Fatunbi A.O., and Jones M.P.(2010). How to set up an innovation platform .A concept guide for the sub-Sahara African challenge program(SSA CP),Forum for Agricultural Research in Africa.

Results

❑Only two villages (Ubiri and Mbuzii) in Lushoto district have established IP. In other villages most of the respondents are unaware about IP

❑Major identified strengths of IPs are availability of constitution, by-laws and defined organizational structure.

❑The major weaknesses found were missing key actors such as input suppliers and financiers, insufficient fund, poor meeting attendance and high dropout.

❑The identified opportunities were availability of committed farmers and high milk demand in the market, availability of input suppliers, extension services, financial institutions.

❑Major threats to IPs were unstable milk price and high cost of borrowing

❑Major benefits obtained from IPs include: enabling access to tailor made training on pasture production, milk hygiene, animal health, and credit access

❑ Key challenges faced by farmers are: insufficient funds low milk production and milk prices

Conclusion & Recommendations

❑ Based on the study's findings it is concluded that most of the farmers' challenges are results of absence of strong and active farmers' forums that can be used to enhance communication among themselves and finding solutions to their challenges together.

❑ Therefore for sustainability of IP study recommends that; Missing actors should be included in IP, capacity building to the IP members, awareness creation to the farmers about importance of IP and IP members should initiate business activities that will enable them to obtain fund to implement its activities.

Figure 2: A vehicle at Vitii village in Lushoto district collect milk from collection centre and transport to Tanga Fresh processing industry.

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