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Shaping interaction among improved cowpea's farming: Do Institutions have a role to play? A case of Oyam district in Uganda

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This paper examines the roles played by institutions in shaping the interactions among improved cowpea farmers in Oyam district. A cross sectional research design and qualitative approach was used. Focus Group discussions were held and members were purposely selected. The study found out that the cowpea farmers normally provide and share farm saved seeds preserved from the previous harvest with fellow farmers while these seeds are un-inspected by a technical person. Cowpea farmers believe in trust and rely on fellow farmers for source of seeds or technical information on the agronomic and post-harvest practices and potential market opportunities. Cowpea farmers remained vulnerable to unreliable supply of certified input (seeds), and resorted to own farm saved seeds and make them more susceptible to counterfeit cowpea seeds and other input. The poor performance of counterfeit input (seeds) supplied to cowpea farmers by fellow farmers and other counterfeit input dealers made farmers loose trust on formal input supplies and depended more on the on-farm saved seeds from fellow farmers recycled over time. The study recommends that the district local government should put in place the formal institutions that would ensure other actors understands the incentives and disincentives so as to re-align individual interests, create actors' inter-dependence in a bid to improve on the competitiveness of improved cowpea. The concerned agencies should strengthen the registration of actors engaged in the development and promotion of innovation at the lower local government and ensure traceability of input used by farmers to stream line actors' roles.

Key words: Institution, actors' interaction, agricultural innovation systems, improved cowpea.

INTRODUCTION

Agriculture remains a main source of income to about 2.5 billion people in developing countries (Challa, 2013; Mwangi and Karuiki, 2015). The challenges including, increasing population, climate variability and urbanization continue to put pressure on the agricultural production

systems that affect global food production, income, nutrition and national economies (FAO, 2012; Kikuru et al., 2013). The complexity of the agricultural sector comprising different actors like farmers, extension agents, agro input/output traders, financial organizations,

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researchers and non-Governmental Organizations (NGOs) promotes the application of improved agricultural technologies that requires consistent interaction among the actors (FAO, 2012; UBOS, 2019; Ministry of Agriculture, Animal industry and Fisheries MAAIF, 2019). According to Widyarini and Togar (2014), interactions offer opportunity for actors to provide and share different pieces of information and other resources. Carsten and Jari (2014) revealed that information related to agronomic, post-harvest practices, certified input source, financial opportunities and potential market opportunities are significant in enhancement of technologies to support increased farm yields, market shares and profitability. This requires functional institutions that harmonise egoism, opinion and create the need to rely on each other to ensure that different interests are negotiated and implemented (Dressel et al., 2019).

While Hodgson (2006) and Nicelotta et al. (2017) consider institution as a societal structure that emphasises potential formal and normative (norms) behaviour needed to enhance an understanding among individuals. Mukwaya et al. (2015), refer to institutions as sets of rules, procedures, laws, by-laws, policies, and norms used by sets of individuals as standard operating procedures. Their study equated and categorized institutions based on its availability and used in the study area, to include existing formal rules, memorandum of understanding (MOU), by-laws, agreements, ordinances, informal norms, and believes, that guide interaction among actors (individuals and organizations) engaged in the improved technology development and promotion, to enhance production and competitiveness. The existing organizations and farmer groups are engaged in the development and promotion of the cowpea enterprise provided insights on the availability and use of MOU, agreements, district ordinances, sub-county by-laws, in guiding or even dictating on the cowpea actors' interaction in a bid to enhance its (cowpea) production and competitiveness. Accordingly, most formal institutions have remained functional at the intra-organizational level and less functional across organizations, and the farmer level. Accordingly, both formal and informal institutions become rules only when they are at times enforced and later accepted for it to become a norm, in shaping human behaviour (Hodgson, 2016), and this renders an organization or family unit, individuals, as players, while institutions become the rule of the game. Non-the less, there are situations where both formal and informal institutions exist among actors, but are taken-for-granted, and this constrains the core purpose of shaping individual/group's core goal.

The existence of different interest groups/actors, conflict and disagreements are expected but this can be harmonised by sets of rules (formal and informal), that are understood and used by the actors (Mersland et al., 2019). Seemingly, when a decision to interact is made by an actor, different frameworks of meaning and rationale

of action would be diverse institutions who have different interests, agenda, and such agenda influences participation (Mersland et al., 2019). An institution becomes the rules of the game, it creates the need to rely on one another, where different interests are negotiated and implemented (Dressel et al., 2019). Relatedly, Escandon-Barbosa et al. (2019) contend that institutions help to remove uncertainty in economic decision and thus, provide a practical remedy to challenges associated to friction among actors, trade-off in economic gains.

The last five decades has seen cowpea production in Uganda and specifically Lango sub-region, Northern Uganda encountered significant production challenges. This is partly attributed to inadequate institutions required to shape interaction among cowpea actors, for actors to consistently provide and share relevant and timely information and other resources, regarding agronomic, post-harvest and market opportunities (certified varieties/input and output). The low cowpea yield is therefore a function of many factors, for example variety of genetic potential, crop management, rainfall, temperature and so on and this has led to stagnation of cowpea production that range from 250 to 450 kg/ha (Bisikwa, 2014). A functional formal and informal institutions would guide or even dictate onto actors (agro input/output traders, public and private extension agent, researchers, NGOs, farmers) regarding who to interact with, on what account, what seed variety to provide, and when, in a bid to enhance its (cowpea) competitiveness relative to improved beans.

Therefore, improved cowpea is used as a context to provide an understanding on availability and used for formal and informal institutions to guide interaction among actors in a bid to improve on production and competitiveness of improved agricultural crop technologies in Uganda. The objective of this study was to establish the role of institutions in improving cowpea production and provide a better way of improving on the cowpea yield in Oyam district.

THEORETICAL FRAMEWORK

The theoretical framework for this study was derived from the Agricultural Innovations Systems (AIS) theory (Klerkx and Nettle, 2013) and institutional theory. AIS frameworks stem from the failure of the linear extension approaches (Laurens et al., 2017) to adequately provide and share required information by the farmer through interaction among actors. As such, by interaction, actors develop an innovation to improve on production and competitiveness (Alira et al., 2017), and in this context, improved cowpea is considered as an innovation, consisting of multiple actors, who are meant to provide and share information and other services in a bid to enhance the production and competitiveness. The AIS theory provides for the interaction to be effective,

actors require functional institutions (formal and informal) to guide, or even dictate to actors on what information or services to provide/share, when to share and how to provide such information. Whereas, formal institutions like MOU, ordinances, by-laws, and other informal institutions including norms, beliefs, and trusts were the applicable institutions as per the study, such institutions were meant to create opportunities that fulfill the needs and interest of all actors, but most importantly, the farmer who is positioned at the centre of the innovation systems (Laurens, 2017). Notably, institutions are operationalized by individuals on behalf of respective actors and this is why trust is paramount in interactions among actors at all levels. The option of improving food production, nutrition, income and national economy is the development, promotion and use of improved agricultural technologies (Loevinsohn et al., 2013).

The Sustainable Development Goal (SDG) advocates for an integrated and well managed national institutions that focus on developing a robust National Agricultural Research Systems and interaction among actors, to enable improved technology development, innovations, and promotion (Leslie et al., 2014).

The status of cowpea farming

In Uganda, the agricultural sector accounts for over 68% total employment, 28% gross domestic product (GDP) and 48% of the export sector, respectively (UBOS, 2019; MFPED, 2019; MAAIF, 2019), and it is recognised as an important sector for national development. The institutional frame-works like Vision 2040, National Agricultural Policy (NAP, 2013), Seeds and Plant Act (2006), National Agricultural Extension Policy 2018, East African Community Vision 2050, African Agenda 2030-2063 (Goal 5), SDG 2 & 9, all emphasise the need to enhance the competitiveness of agricultural sector as a key avenue to achieve the aspired middle-income status, by 2020-2040 (UBOS, 2019). These frame-works therefore advocates for strengthening of the National Agricultural Research Systems (NARS), actors' collaborations and extension services delivery systems in order to develop and promote improved agricultural technologies. Some of the technologies include improved crop varieties/livestock breeds and farm practices (MFPED, 2019). The improved cowpea is used as a context to help understand the contribution of MOUs, ordinances, by-laws, beliefs, norms, in shaping actors' interaction in a bid to enhance improved cowpea (SECOW 4W and SECOW 3B) competitiveness relative to improved beans (NABE2 & NABE4) in the selected sub counties in Oyam district. The improved beans are measured relative to cowpea in this study, for beans is considered as the main source of food and income among legume food crops in the Lango sub-region (UBOS, 2019).

Cowpea (*Vigna unguiculata*) is an herbaceous food legume belonging to the plant family Fabaceae, with a potential to increase food, nutrition, national economy and income security among farming communities (Bisikwa et al, 2014). It is cultivated across Africa as the source of high-protein foods and edible nutrient-rich leaves (Bisikwa et al., 2014). Nigerian being the largest producer and consumer of cowpea account for 61% of the 5.2 million tons and 58% of the 5.4 million tons of the production in Africa and globally, respectively (Bisikwa, 2014; Ddamulira, 2017). Uganda is ranked the 8th largest producer of cowpea in Africa, grown by over 2.2 million smallholder farmers with total annual production of nearly 22,000 tons (Ddamulira, 2017). Cowpea in Uganda is grown throughout the country but Eastern and Northern region being the 1st and 2nd largest producers in the country (Ministry of Agriculture, Animal Industry and Fisheries MAAIF, 2017; UBOS, 2019). The seeds and leaves are sold in nearly every market in the country. The Acholi and Langi ethnic groups call it "Boo", Ateso calls it "Eboo" and the Baganda calls it "Ggobe". In Uganda, cowpea is considered as the 4th most important legume food crop after beans, groundnuts and soya beans, respectively (Ddamulira, 2017). Conversely, unlike other legume food crops, cowpea adapts easily to harsh climatic conditions (Bisikwa et al., 2014). Therefore, the increasing severity of climatic stress resulting from climatic change implies that cowpea may turn out to be the major and cheap source of protein, with 35% protein content desired to reduce malnutrition in Northern Uganda. This could go a long way in reducing malnutrition in the region especially among the children below five years of age, with 47% of whom are reportedly malnourished (UBOS, 2019).

The role of institutions in improving cowpea farming

The formal and informal institutions are inter-dependent (Phatela and Ajuruchukwa, 2015), and where informal institutions have failed to address the standard ways of operation then formal institutions are emphasized to realign the diverse interest, views, and opinion of actors in a society. Mukwaya et al. (2015) alluded that both formal and informal institutions are designed and implemented by human beings to serve as incentives and disincentives, in-terms of restrictions for increasing benefit and developing new rights to the end users. The norms, beliefs, trust are embedded in the lives of the people, since people are born and they live with such norms (Mukwaya et al., 2015), thus, in practice, informal institutions tend to control the formal institutions. Accordingly, formal institutions may be introduced in a society and fails to achieve its desired goal, partly because they are not accepted, to become the rule of the day-to-day (Nicelotta et al., 2015; Malekani and Kavishe, 2018). This implies that for any institution (formal or

informal) to be accepted, used, and becomes the rule of the game, users ought to understand its benefit in shaping their lives, or should be enforced.

The efforts to harness the potential of cowpea in enhancing income, nutrition, national economy and food security in Northern Uganda has mainly focused on increasing production through breeding improved varieties (Ayaa et al., 2018), with limited contributions in establishing institutions, and ensuring its use to shape actors' interactions as one option for access to information and other services, in a bid to increase production, distribution, promotion and competitiveness. Makerere University Agricultural Research Institute Kabanyoro (MUARIK), in collaboration with Rockefeller Foundation, McKnight Foundation and later with research partners from National Semi-Arid Resources Research Institute (NaSARRI), developed and released several improved cowpeas, including SECOW (Serere Cowpea), 1T, 2W, 3B, 4W, 5T, and EBOWO series like ACCWC28, ACCW35b, ACCWC39, ACCNE 4 (Bisikwa, 2014). The varieties were tested for both scientific and socio-economic fit (Bisikwa, 2014), but significantly, the SECOW series were specifically disseminated to the selected farmers, using on-farm trials in Lango sub-region.

However, during the establishment and management of on-farm trials as a mechanism of interaction among cowpea actors, formal institutions including MOU were established to guide the interaction among researchers (Ngetta ZADI, NaSARRI and MUARIK), albeit minimum effort was considered to integrate other anticipated cowpea actors (agro input traders, cowpea traders, NGOs) in the MOU, to guide some of their activities at farmer level, and yet such actors are required to provide and share technical information and other services (certified input, competitive cowpea market, and financial services).

The availability and use of MOU greatly rotated at the inter and intra researchers' scope, with minimum contribution to continuously support farmers' production and marketing. Consequently, cowpea farmers resorted onto use of existing norms, beliefs and mutual trusts to guide the interaction among fellow farmers in enhancing production and marketing.

The limited institutions could explain why farm yields of improved cowpea has stagnated at 250 to 450 kg/ha and cowpea is considered a kitchen gardening crop, with limited land allocation compared to beans enterprise and yet the crop (cowpeas), unlike other legume food crops, adopts easily to harsh climatic condition, provides a cheap source of protein urgently required among the rural population of Lango sub-region (Bisikwa, 2014).

The researcher's previous proposition held that, use of MOU, ordinances, by-laws, beliefs and norms, create inter-dependence among actors, who provides adequate information required to benefit other actors, but mainly the farmer as the main consumer of such information.

Consequently, the interaction may result to increased yields, market shares and profits of the improved cowpea, relative to improved beans in the Lango sub-region.

METHODOLOGY

A cross sectional research design was used to understand the participation of actors in shaping cowpeas farming in Oyam district. The study adopted qualitative approaches to understand the perspectives, feelings, and attitudes of cowpeas farmers. The study used structured interviews and focus group discussion to collect qualitative information, which helped in providing a detailed analysis of the existing institutions and how they guide interaction among actors in cowpeas farming. The study captured and explained in-depth aspects of MOU, ordinances, by-laws, norms and beliefs on actors' interaction. The study was conducted in the sub-county of Otwal, parishes of Amukugungu, Anyomolyec, and Okii, in Oyam district, and targeted cowpea farmers in the district. The district, sub-county, and parishes were purposively selected since they constituted the areas where improved cowpea research was piloted by MUARIK, Ngetta ZADI, and NaSARRI. Actors were purposively selected for their experience in production and promotion of improved cowpeas. Their contributions were useful in providing additional information on existing institutions, and institutions guide the interaction among cowpea actors. The records from district production department of Oyam district provided additional insights on extension agents, which supplemented cowpeas farmers' records and cowpea researchers' records at Ngetta ZADI and NaSARRI. Qualitative data was collected from 20 key informants including, 6 researchers from MUARIK, Ngetta ZADI, and NaSARRI, 6 agro input/output traders, 4 government extension agents, and 4 NGOs in the sub-counties of Otwal. Additionally, 3 FGDs containing 10 members each were held at each parish. The researcher facilitated the discussions, which lasted for about 1 to 2 h. The researcher reviewed documents from MOU with AFST, Alito Joint Christian Co-operative, MUARIK, Ngetta ZADI, district ordinances, and by-laws. Respondents for both FGDs and KIIls comprised individual farmers involved in the improved cowpea production and promotion in the Lango sub-region. The researcher analysed data from interviews and FGDs and generated categories and themes. Finally, the researcher ethically related with participants, and carefully observed confidentiality, privacy and integrity which are very important ethical considerations.

Data analysis

The qualitative data on challenges faced by institutions in using the available norms and beliefs, and existing opportunities to improve on the relationship were equally collected. The farmers' representatives for the Focus Group Discussions were constituted by farmers who participated in the cowpea pilot project activities (2012-2014), hosted on farm trials and had a minimum of one acre of land allocated onto cowpea and was involved in active cowpea farming in the period 2019-2020. Thus, given their (farming) experience, ranging from the time improved cowpea pilot study was carried out they would provide more in-depth information on the availability and usefulness of the formal and informal institutions that guide cowpea actors' relationship. The qualitative data on available MOU, ordinances and by-laws, was collected using 20 Key Informant Interviews (KIIs), comprising 6 researchers, 6 agro input and output traders, 4 extension officers, and 4 NGOs. Respondents for the KII were selected on the basis of organization's participation in the cowpea production and promotion. The data

was edited and reviewed for completeness. The researcher reviewed documents, including content of the existing MOU during the KII with the researchers' (Ngetta ZADI, MUARIK) respondents, agreements, ordinances and by-laws.

The researcher undertook open data coding and during the coding processes actors were provided the following codes: Extension agent (Ext), Agro input trader (IT), Agro output trader (OT), Researchers (MUARIK, NASARRI, ZADI), Farmers (Farm), NGOs (AFST, OCPD & Lango Rhites), Formal institutions like MOU, Ordinances (Ord), By-laws (By-L), and informal institutions like Norms (Nor), Beliefs (Bel). The research findings on institutions were categorized information of available formal and informal institutions. The coding and categorization of findings were guided by the research objective and proposition, to enhance the formation of the four themes. The categorization of the available actors and institution was based on the account that institutions are operationalized by individuals on behalf of respective actors.

FINDINGS

During the FGDs held at Amukugungu, Anyomolyec and Okii parishes, of Oyam district, respectively; by consensus, farmers identified fellow farmers as main actors in the improved cowpea, positioned as input and output dealers, but with no officially certified input or output trader. The cowpea farmers normally provide and share farm saved seeds preserved from the previous harvest with fellow farmers while these seeds are uninspected by district production department of Oyam district, and cowpea seeds/input are sold in the local market, road side or at home with each actor pushing to maximise self-gains. Cowpea farmers believe in trust and rely onto fellow farmers for source of seeds or technical information on the agronomic and post-harvest practices and potential market opportunities. These observations seem to coincide with "...we have the 'Odongee' who are seasoned cultivators of cowpeas, and have always showed us their success factors. They prepare his garden early enough before the rains come. And once the rains have cooled the ground, they go ahead to plant. This was a revelation new to most of us though we considered ourselves good at cowpeas' cultivation..." (INTERVIEWEE 4). This excerpt suggests that 'adwongee' literally 'elders' are using traditional knowledge to make out from cowpeas. Implicitly, most of the cowpeas' farmers might not rely on external actors to improve their cowpeas' productivity. Whereas, the contribution of researchers including NaSARRI and Ngetta ZADI was observed during the pilot study of the cowpea varieties (SECOW series), since then, farmers routinely rely on fellow farmers as major source of technical information to improve on yields, market shares and profitability. Correspondingly, the District Production Coordinator of Oyam, during the KII, corroborated with the farmers, acknowledged the contribution of researchers during the piloting of the black and white cowpea (2012-2014), by providing information on agronomic and post-harvest practices, but maintained that since the introduction of black and white cowpea,

farmers have been supporting each other with seeds, output market, information on agronomic and post-harvest practices.

This is contrary to the bean's enterprise, with supportive district ordinances, that ensure bean seed suppliers are prequalified and registered by the district local governments. Seeds are certified by the district production department, to ensure they met recommended purity standards, with extension officers frequently visiting selected farmer's bean farms, mostly farmers under registered farmer groups, to provide and share technical agronomic and post-harvest challenges. The sub-county would receive beans seed supplies through the operation wealth creation, and other NGOs including Agency for Sustainable Rural Development (AFST), and ensures the seeds and other inputs are supplied to support farmers' groups in the sub-county, makes follow up to respective bean farmer groups. According to some respondent, "...I want to believe that something is not going on well. If the cowpeas' farmers were to be supported like the bean farmers, trust me, cowpeas farmers would be the richest. But we have this 'alonyo' who supplies World Food Programme! He has at least made a lot of money from cowpeas. But the support for cowpeas farming is still low..." (FOCUS GROUP 3). This excerpt suggests that there are some variations in the way actors respond to different farming programmes.

The affirmative agricultural support program at the sub-county is handled under the sub-county advocacy guidelines, headed by the sub-county chief, albeit there are no by-laws supporting interaction among actors engaged in beans promotion and production. In the KII with the sub-county extension officer, Otwal sub-county, he re-affirmed, the sub-county council has not approved a by-law that guide activities of actors promoting agricultural value chain at the sub-county. Besides the existing sub-county agricultural advocacy programs that focus on key district priority crops including beans, the MOU signed between AFST and Alito Joint Christian Co-operative, and beans farmer groups, provides a better opportunity for bean farmers to regularly receive technical information on agronomic, post-harvest practices, and potential market opportunities, and additionally, bean farmers are organised into farmer groups, for they (farmers) regularly receive free certified input and finance support, towards crop harvest, storage facilities and transportation to the market. It was by consensus that bean farmers rely more on farm saved seeds got from previous harvest and sold in the local market. In view of the support given to bean farmer groups, one key informant reiterated: "...it's just because all of us cannot turn to bean cultivation. But bean farmers are to some degree organized. As for cowpeas farmers, these formally recognized groups are less evident..." (INTERVIEW 6). The key informant acknowledged the support provided to bean and other crop farmers, which seem to be lacking among cowpeas farmers. It may not

be of a surprise that most of the cowpeas farmers look to fellow farmers, and perhaps the elder lies for lucrative cowpeas cultivation.

The KII with the breeders and agronomists from NaSARRI, MaRCCI and Ngetta ZADI, 6/6 of the respondents revealed, inter-organizational MOU was signed among cowpea research actors in a bid to enhance production and promotion of improved cowpea. MUARIK had key roles of developing the profile of improve cowpea, based on market preference, resistance to pests, diseases, harsh climatic condition and yields, financing the research, while NaSARRI undertook station trials providing land for on-station trials, providing human resources to support on-station trails, and finally, Ngetta ZADI whose major tasks focused onto dissemination of improved technology to the farming communities, during the on-farm trials. Consequently, cowpea varieties were developed (SECOW series), and disseminated to the farmers in Lango sub-region using on-farm demonstration.

DISCUSSION

MOU that has been among cowpea researchers need to have been incorporated by key actors like agro input and output traders. They also need a mandate of cowpea value chain to facilitate cowpea production, distribution of certified input (seeds, pesticides, insecticides), technical information dissemination and agronomic, post-harvest practices and potential market opportunities. Thus, engagement with agro input and output traders create loyalty among actors regarding source of information and other services (Rugema et al., 2017; Katia et al., 2019). The interaction between farmers and other actors creates product loyalty, since customers (other actors) constitute part of the production and distribution processes.

Besides, the district ordinances focused on streamlining activities of actors in the bean's enterprise by pre-qualification of the suppliers, registration of the input suppliers and certification of the bean seeds for supply to the farmers. Accordingly, cowpea farmers remained vulnerable to unreliable supply of certified input (seeds), and resorted to own farm saved seeds and makes them more susceptible to counterfeit cowpea seeds and other input. The poor performance of counterfeit (seeds) supplied to cowpea farmers by fellow farmers and other counterfeit input dealers made farmers loose trust on formal input supplies and depended more on the on-farm saved seeds from fellow farmers recycled over time. The farm saved seeds have high degeneration effects due to high susceptibility to pests and diseases (Mwangi and Karuiki, 2015), and given the perspective this affects cowpea yields, market and profitability.

In the FGDs with cowpea farmers at Anyomolyec, Amukugungu and Okii parishes of Otwal sub-county, Oyam district, 40/40 respondents, cowpea farmers revealed that their trade with the local market agents and

fellow farmers were built on trust and members have the liberty to sell or hoard their produce. Trusts among cowpea farmers creates product loyalty, as, Zaugg (2016), Rugema et al. (2017), and Katia et al. (2019) allude that strong ties based on trust and provide opportunity for actors' collaboration other than competition in the value chain and actors ably constitute part of production and distribution channels, develop product loyalty, avoid middle men traders and contribute towards increased market shares and profitability (Zaugg, 2016; Rugema et al., 2017; Katia et al., 2019).

The improved beans enterprise, 30/40 of the farmers revealed that using bean farmers' association and in consideration of the formal trade agreements with output traders, schools, whole sale traders and NGOs like World Food Program they have been able to sell their grains outside their village settings expanded on market scope across borders. The farmers under the trade agreements have access to small cash loans from the farmer association, large produce dealers, and schools in order to facilitate post-harvest handling processes and delivery of farm produce to their clients. Beans farmers' association (Okii oil seeds, Link to progress, Can-Omonanino, Alolocaniyo) provides opportunity for bean farmers' access to timely source of information on agronomic, post-harvest and potential market opportunities.

The over dependence on fellow farmers by cowpea farmers for source of seeds, market opportunities and other technical information regarding the agronomic and post-harvest practices is not in accordance with the AIS, where actors in the cowpea such as researchers, extension agents, farmers, and NGOs were meant to consistently provide, share information and other services, in a bid to improve on yields, market shares and profitability. Each actor pushed for his goals and attains exclusive market gain. This is attributed to weak informal institutions like norms, beliefs and trusts, that have failed to guide other actors like researchers, extension agents, traders, NGOs in the cowpea production and promotion.

The supportive formal institutions like ordinances, by-laws, agreements and MOU ought to have been used to compliment on the active roles of the informal institutions in guiding or even dictating on other actors' roles in providing and sharing cowpea information and other services to benefit the farmers. This is in agreement with, Phatela and Ajuruchukwa (2015) who alluded to the fact that formal and informal institutions are inter-dependent and where informal institutions have failed to address the standard ways of operation, then formal institutions should be emphasized to re-align the diverse interest, views, and opinion of actors. The low attention to cowpea enterprise by actors due to low usage of available institution does not comply to the NAEP (2018), that advocated for the establishment of formal institution at the lower local governments by enactment of district ordinances and by-laws that would ensure purity free

seeds are supplied to the farmers by strengthening interaction among actors in the agro value chain. Such a framework is intended to strengthen the harmonisation of goals and objectives of actors in a value chain (MAAIF, 2017; MAAIF, 2019; MFPED, 2019).

CONCLUSION AND POLICY IMPLICATION

The use of formal institutions like MOUs, ordinances, agreements and by-laws, strengthens inter-dependence among actors and the need to rely on one another for information (agronomic, post-harvest practices, potential market opportunities, other input and financial services) where the informal institutions fail to fulfill the desired aspirations of promoting an innovation, then formal institutions should be instituted to re-align and change the status quo that stagnates interaction among actors. Accordingly, in the beans enterprise, the harmonization of national agricultural policies like NAP (2013) and NAEP (2018), with other frameworks including, seeds inspection and certifications unit under the Ministry of Agriculture Animal Industries and Fishers, MOU, district ordinances, and by-laws, have provided bean farmers opportunity to regularly access relevant and timely technical information regarding agronomic/post-harvest practices, potential market opportunities and other financial services. Consequently, providing it (beans) a hedge in-term of land allocation, high yields and marketing opportunities compared to cowpea. This contradicts the aspirations of the architects of National Agricultural Policy 2013, National Agricultural Extension Policy 2018, National Development Plan I, II, III, East African Community Vision 2050, African Agenda 2030-2063, and SDGs which advocate for the promotion of both national priority crops like improved beans, alongside other important food security crops like improved cowpea, that is needed to compliment on rural household food security, income, nutrition, and national income, as a mechanism to enhance the competitiveness of the agricultural sector, and drive the economy to a middle income status by 2020-2040.

RECOMMENDATION

In a bid to enhance the competitiveness of improved agricultural crop technologies, lower local government at district, sub-county and parish levels need to implement national policies and laws by enacting subsidiary regulatory frameworks including district ordinances, by-laws, and MOU, as a requirement to shape inter/intrainteraction among institutions engaged in the production and promotion of the improved technologies. There is urgent need to strengthen registration of institutions engaged in the development and promotion of innovation at the lower local government and ensure traceability of input used by farmers to stream line

institutions roles and put in place penalties against actors engaged in sales of counterfeit input.

The district local government should put in place the formal institutions that would ensure other actors understands the incentives and disincentives so as to re-align individual interests, create actors' inter-dependence in a bid to improve on the competitiveness of improved cowpea.

This mechanism shall ensure farmers receive relevant, timely, frequent and adequate information/other services on the agronomic, post-harvest and market opportunities, in a bid to enhance the competitiveness of the improved agricultural technologies. As such, this fulfils the aspirations of the NAP (2013), NAEP (2018), NDP III (2020), East African Community Vision 2050, African Agenda, 2030-2063, and SDGs, focused on increasing the competitiveness of improved agricultural technologies in terms of improved yields, market shares and profitability, as a means to transform the lives of the rural farmers from subsistence to prosperous and middle-income status by 2020-2040.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

RERERENCES

- Alira EW, Hildegard G, Mulubrhan A, Hermann W (2017). Agricultural Innovations systems. *Journal of Agricultural Education and Extension* 24(1):65-87. DOI: 10.1080/1389224X.2017.1386115
- Ayaa F, Alumai A, Dranzoa C (2018). Indigenous Knowledge Influences Cowpea among Small Holder Farmers in Northern Uganda. *Scholars World- International Journal of Arts, Science and Commerce* 6(1):1-5. ISSN: 2320-3145.
- Bisikwa J, Kawooya R, Ssebuliba JM, Dgungu SP, Biruma M, Okello DK (2014). Effects of plant density on the performance of local and elite varieties in Eastern Uganda. *African Journal of Applied Agricultural Sciences and Technology* 6(13):28-41, DOI: 10.4236/vp.2020.64020.
- Carsten J, Jari DJ (2014). Games as Actors. *Interaction, Play Design and Actor Network Theory. International Journal of Advances in Intelligent Systems* 7(3-4):412-422. ISSN: 1942-2679
- Challa M (2013). *Determining factors and Impacts of Modern Agricultural technologies adoptions in West Wollega, Munich, GRIN Publishing Gmb* 4(20). ISSN:2225-093X.
- Ddamulira G, Carlos AF, Mildred A, Ramathani C, Maphosa M (2017). South African Journal of Plant and Soil maturity, Protein content and yield stability of Cowpea in Uganda 34(4):255-261. DOI:10.1080/02571862.
- Dressel S, Johansson M, Goram E (2019). Perceived adaptive capacity within a multi-level governance setting: The role of bonding, bridging and linking social capital. *Environmental Science & Policy* 104:88-97. <https://doi.org/10.1016/j.envsci.2019.11.011>
- Escandon-Barbosa D, Urbano-Pulido D, Hurtado-Ayala A (2019). Formal Institutions and Entrepreneurial Activities: A comparative relationship between rural and urban areas in Columbia. *Journal of Urban Management* 8(3):458-471 DOI: 10.3390/su11020550
- Food and Agricultural Organization (FAO) (2012). *The State of Food and Agriculture 2012*. ISBN: 978-92-5-107317-9. <https://www.fao.org>
- Hodgson GM (2016). What are Institutions? *Journal of economic issues* 40(1). ISSN:0021-3624(print) 1946-326X <https://www.tandfonline.com/loi/mjei20>
- Katia AFR, Álvarez-Ávila MD, Hernández Castillo F, Schwentesius

- Rindermann R, Figueroa-Sandoval B (2019). Farmers market actors, Analysis and attributes: A Bibliometric study. *Journal of Sustainability* 11:745. DOI: 10.3390/Su11030745
- Kikuru GT, Gachanja P, Obere A (2013). The impact of Population Change on Economic growth in Kenya. *International Journal of Economics and Management Sciences* 2(6):43-60. DOI: 4172/2162-6359
- Klerkx L, Nettle R (2013). Achievements and Challenges of Innovation co-production support initiatives in the Australian and Dutch Diary sector: a comparative study. *Food Policy* 40:74-89. DOI: 10.1016/j.foodpol.2013.02.004
- Laurens K, Petter Stræte E, Kvam GT, Ystad E, Butli Hårstad RM (2017). Achieving best-fit configurations through advisory service provisioning for diverse types of farmers in Norway. *Journal of Agricultural Education and Extension* 23(3):213-229. ISSN: 1389-224X, <http://dx.doi.org/10.1080/1389224X.2017.132060640>
- Leslie L, Thornton P, Campbell BM, Baedeker T, Braimoh A, Bwalya M, Caron P, Cattaneo A, Garrity D, Henry K, Hottle R (2014). Climate-Smart Agriculture for Food Security. *Nature Climate Change* 4(12):1068-1072.
- Loevinsohn M, Sumberg J, Diagne A (2013). Under what circumstances and conditions does adoption of technology result into increased productivity? Protocol, London, EPP, Centre, Social Sciences Research Unit. <http://jolis.worldbankimflib.org/en/jolis.htm>.
- Malekani A, Kavishe GF (2018). The Role of Institutional Repositories in making lost or hidden culture accessible; a study across four African University libraries. <https://www.researchgate.net/publication/239519235>.
- Mersland RS, Golesorkhi S, Randoy T, Shenkar O (2019). The performance Impact of Informal and Formal Institutions Differences in Cross-Border Alliances: The Case of the Micro Finance Industry, *International Business Review* 28(1):104-118. www.elsevier.com/locate/ibusrev
- Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) (2019). Agricultural Annual report. [https://www.agriculture.go.ug>sector performance report](https://www.agriculture.go.ug>sector%20performance%20report)
- Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) (2017). Agricultural Sector Strategic plan, ASSP 2015/2016 to2019/2020s
- Ministry of Finance, Planning and Economic Development (MFPED) (2019). Agricultural annual report. <https://www.finance.go.ug>bmau.reports>
- Mukwaya PI, Makooma MT, Bamutaze Y, Luswata CK, Kirya D (2015). Institutional factors & governance arrangements affecting crops residues utilization in Mt Elgon region, Uganda. *Journal of geography and regional planning* 8(3):65-83. DOI:10.5897/JGRP2014.0469
- Mwangi MN, Karuiki S (2015). Factors determining adoption of new Agricultural technology by Small holder farmers in developing countries. *Journal of Economics and Sustainable Development* 8(3)65-83.
- National Agriculture Extension Policy (NAEP) (2018). The Ministry of Agriculture Animal Industry and Fisheries. <https://www.agriculture.go.ug>
- National Agriculture Policy (NAP) (2013). The Ministry of Agriculture Animal Industry and Fisheries. <http://agriculture.go.ug, www.agriculture.go.ug>
- Nicelotta E, Lounsbury M, Greenwood R (2017). Pathways of Institutional Change: An integrated Reviews and Research Agenda. *Journal of Management* 43(6):1885-1910. DOI:10.1177/0149206317699522
- Phatela MR, Ajuruchukwa O (2015). An Analysis of Institutional Factors Influencing Vegetable Production among Small-Scale Farmers in Six Vegetable Projects of the Nkonbe Local Municipality. *Journal of Agricultural Sciences* 7(6). ISSN, 1916-9752, DOI:10-5539/jas.v7n6p184, E-ISSN 19167960
- Rugema SH, Seguya H, Kibwika P, Yildiz F (2017). Information Quality, Sharing & Usage in Farmer Organization. A Case of Rice Value Chain in Bugiri and Luwero Districts, Uganda. *Cogent Food & Agriculture* 3(1):1-16. <https://doi.org/10.1080/23311932.2017.1350089>
- Uganda Bureau of Statistics (UBOS) (2019). Uganda Census of Agriculture. <https://www.ubos.org>uploads>publications>.
- Widyarini M, Togar S (2016). Social Interaction and price Transmission in multi-Tier Food supply chains. *Journal of Operations and supply chain management* 9(1):110-128. DOI.12660/joscmv9n110-128
- Zaugg M (2016). Analysis to inform Library communication patterns within the Harold B.Lee Library. Unpublished Library Assessment conference.