

Networking and Sustainability of Grass-roots relay organisations in Western Cameroon: Case Study of CIEFAD and KUGWE Rural Resource Centres

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ABSTRACT: *Purpose:* This paper aims to chart sustainability and transition plan for rural resource centres (RRCs) by mobilising resources to continue provide services in the context of limited or no external funds.

Design/Methodology/Approach: We exemplify the role of networking to the sustainability of RRCs by conducting an ethnographic study of two RRCs in the West Region of Cameroon. Networking has become an increasingly popular approach that aims to provide grass-roots relay organisations new opportunities for securing uninterrupted provision of goods and services to farmers. Social network analysis is the research analytical tool used to make network theory operational into an applicable set of key variables needed to map the networks that can secure the sustainability of RRCs in Cameroon.

Findings: Customer of seeds, institutional organisations including development partners, research centres and municipalities greatly influence RRCs' organisational and financial sustainability.

Practical implication: RRCs have been commended by farmers as a responsible, cost-effective, sustainable and complementary approach to other agricultural extension approaches. As the fulfilment of farmers' needs determines the viability of RRCs, it is crucial that the latter are successful in transitioning to their new role as service providers.

Originality/value: Current there is emergence of new private actors offering agricultural services in Cameroon, and this research sample is of interest for grassroot relay organisations for identifying the requisite conditions to become autonomous and less reliant on external funding in their efforts toward fulfilling farmer's demand.

KEYWORDS: Networking, ties, sustainability, rural resource centres.

1 INTRODUCTION

The determinants of the uptake of sustainable technologies scattered in sub-Saharan Africa have been the subject of several studies, and socio-economic, institutional, technical and political factors have been identified (McCulloch *et al.*, 1998, Boyd *et al.*, 2000; Mbagal-Semagalawe and Folmer, 2000; Drechsel *et al.*, 2005; Sidibe, 2005). While these factors undoubtedly contribute to low adoption rates, it is currently recognized in the scientific community that the approaches used in the diffusion of new technologies in sub-Saharan Africa are the major adoption barriers (Oehmke and Crawford, 1996). Thus, in an attempt to increase the adoption levels of new technologies in sub-Saharan Africa, this region is now witnessing a change in a number of paradigms in the fields of agricultural research for development. Indeed, a multitude of approaches have been tested and implemented, namely participatory research methods, agricultural knowledge and information systems, rural livelihoods, agri-food value chain and second green revolution. However, adoption rates have only increased slightly. Furthermore, the adoption impact of technologies developed and disseminated across the above approaches on agricultural productivity and well-being has been only marginal (Renkow and Byerlee, 2010). More importantly, these approaches have been strongly challenged for their inability to adapt technologies to the needs of smallholder farmers in sub-Saharan Africa who are most often vulnerable and at risk to harsh conditions, including climatic and non climatic threats. In particular, these approaches proved to depict a deficit in internalising some external factors that hinder the adoption of new sustainable technologies. To address these shortcomings, one of the most recent paradigm shifts in agricultural research for development has focused on the recognition of research, technology transfer

and the use of technology as elements of a single entity rather than independent activities (Binam and Sogoba, 2014). Equally, Asaah *et al.* (2011) find that the uptake of research results can be attributed to the importance that research places on the needs and interests of farmers and the fact that the extension approach used integrates indigenous knowledge, local culture, local species and helps address sensitive rural issues, such as soil fertility degradation, poverty, malnutrition and unemployment. Moreover, in a rapidly changing environment, farmers need a package of innovations and services, in addition to a continuous access to adequate knowledge and information. All of this together in the rural context can greatly accelerate the adoption of innovations and increase benefits for farmers (Degrande *et al.*, 2015).

One such complementary approaches promoted since a decade by the World Agroforestry Center (ICRAF) is known as the Rural Resource Centres (RRC). The latter are defined as learning and demonstration centres run by organisations grounded on the local context and also serving as relay interface between research institutions (or projects) and peasants or end-users for the diffusion and appropriation of certain technological innovations in the target area (Asaah *et al.*, 2011). This extension approach is based on building farmer capacities to generate innovations along the agricultural production and marketing system. It emphasizes certain features such as access to knowledge, interactive learning and networking (among peasants and between these and other stakeholders) that can help rural people improve their living conditions. Overall, the main services provided by RRCs include learning and demonstrating new technologies, access to market information, connection to the market and exchange forum among farmers and between them and other rural actors (Takoutsing *et al.*, 2014b). From this perspective, RRCs create opportunities for peasants to share their experiences and receive technical advice and services that are tailored to their livelihood needs. RRCs main activities revolve around the promotion of agroforestry innovations including (i) participatory domestication trees, (ii) integrated soil fertility management, (iii) income generating activities, and (iv) processing of agroforestry product and NTFPs (Asaah *et al.*, 2011). These activities are grouped into two categories: the provision of training, extension and agricultural advisory services and the production and marketing of agricultural products (Kenfack, 2014). The majority of farmers believe that RRC fulfills three key functions in one: *'train-inform-educate'* after which comes the support and supervision function. It was further reported that farmers in the Western Region of Cameroon, based on the criteria developed by Swanson and Rajahlati in 2010 - *including responsible approach, cost-effective approach, sustainable approach, complementary approach with other extension approaches, increase and innovation of material information flows, access to benefits for women and youth* - to assess whether an extension program is effective or not, state that the RRC approach proved to be more adequate to accomplish their needs compared to the extension approaches they experienced before (Eboutou, 2013). As such, producer organisations receive support from RRCs in terms of advice, training, provision of plant seed and agricultural equipment (Kenfack, 2014). Yet, it was widely recognized that, more than any other input, improved plant seed is key to increasing agricultural productivity and income generation (Hassan *et al.*, 2001; Minot, 2008; Takoutsing *et al.*, 2013). On one side, the lack of high-quality plant seed was identified as a major hurdle to a greater adoption of agroforestry innovations (Takoutsing *et al.*, 2014a). On the other hand, the availability of quality seeds increases the yields of food crops by 20-40% (Takoutsing *et al.*, 2014a). This gives priority to the RRCs as they are currently supplier's sources of high quality plant seed to farmers and other clients (town halls, schools, churches, individuals producers) for afforestation and reforestation purpose, and both as a means of improving soil fertility and source of improvement of well-being through provision of food, firewood and carpentry wood (Kenfack, 2014). Thus, the RRCs have effectively improved the accessibility and availability of quality plant seed that is now acquired at an affordable price pertaining to the proximity of suppliers and reduced transaction costs. Besides, revenue from the sale of improved plant seed has become an incentive for RRCs and may have the potential to significantly contribute to the sustainability of the system (Takoutsing *et al.*, 2014a).

This notwithstanding, concerns have been raised recently about the viability of RRCs in the conduct of their activities. In the last few years, difficulties faced by RRCs have been reported including limited access to capital equipment, lack of technical and managerial skills, limited access to basic equipment, limited agricultural land, lack of adequate credit and other financial facilities to boost their activities, and insufficient support from the government, public sector and policy makers (Takoutsing *et al.*, 2014b). More disturbingly, RRCs mainly receive technical, material and, to a lesser extent, financial support from several partners such as ICRAF (Kenfack, 2014) indeed; in reality, the action of these partners is hardly ever continuous (Eboutou, 2013). Such concerns bring to stark reality that strong partnerships are essential to ensure both the success and sustainability of any project related to the production and distribution of plant seed (Rohrbach *et al.*, 2002). This means that the ability of RRCs to establish and maintain strategic and diverse partnerships with their customers of seeds as well as other institutional organisations, such as the government agencies, local municipalities, charitable organisations, research centers, universities, Non-governmental organisations (NGOs) and development programs is key to ensuring their viability and sustainability. This deserves to be highlighted as it has been established that successful RRCs do not function as islands (Takoutsing *et al.*, 2014b; Degrande *et al.*, 2015). From this perspective, it appears that the main challenge for the present and the future is how to make RRCs viable in securing uninterrupted provision of services and goods to producers. This is about exploring how diversifying network of partnerships can serve as the most effective ways and means through which RRCs will be able to mobilise resources to continue to provide services as well as how to move toward greater appropriation and continue providing services when there are limited or no funds coming from external sources. Such concern raises important specific questions: In what the profile and typology of the main actors involved in the social, cultural, economic, political and institutional environment of RRCs in Cameroon matters? Is it possible, as some authors claim, that interactions and linkages between RRCs and other cross-cutting actors, including upstream

and downstream actors, serve to securing their organisational and financial sustainability in particular contexts (Rohrbach *et al.*, 2002; Takoutsing *et al.*, 2014b; Degrande *et al.*, 2015) ? If so, how? And how do we go about assessing the strength of these links and what will make the latter more effectual in consolidating the sustainability of RRCs along with the services they deliver?

To help answer these questions, we report the results of an ethnographic study of rural resource centres in two districts in rural West Cameroon that have been targeted by ICRAF, and aiming to foster agricultural innovation and agro-forestry systems related activities by promoting greater diffusion and appropriation of certain technological innovations. Our aim in this article is to examine the contribution of networking to the sustainability of RRCs in Cameroon by (i) mapping the network and dynamic links between the RRCs and their partners; (ii) scrutinizing both strong and weak links of RRCs by highlighting interactions that may affect their organisational and financial sustainability; and (iii) exploring the requisites necessary to strengthen and diversify RRC partnerships to secure their sustainability.

Findings from our ethnographic study contribute to the literature on the role of social network capital in sustaining the efforts of grass-roots relay organisations such that they become a nucleus in implementing activities in an environment where information and knowledge sharing are non-linear indeed, but prove to be effective in rallying project boundary partners namely farmers, change agents, researchers, development partners and policy makers. The empirically grounded narrative about the lived realities of these organisations challenge some of the emerging approaches to agricultural innovation identified by Klerkx *et al.* (2012) through a meta-review and implying that the transfer of technology approach reflects the idea that researchers develop knowledge and technologies, which are then transferred 'top-down' by change agents to farmers or other end-users (e.g. Rogers, 1962). Thus, our study is a continuation of a series of research conducted to date on RRCs and covering the appraisal of their effectiveness along with some of the requisites for the sustainability of their service provision in a given socio-economic context featuring partial or total withdrawal of support from development partners. In the sections that follow, we discuss the emergence of RRCs and examine their theoretical basis as grass-roots relay organisations. We then describe our ethnographic study of RRCs in two districts in the West Region of Cameroon and analyse their experiences of networking and sustainability. We conclude by discussing implications of our findings and providing directions for future research.

NETWORK SOCIETY THEORY AND SUSTAINABILITY

Network society theory considers society organisations as a system of objects (e.g. individuals, groups, and organisations) tied by a variety of relations. Thus, network analysis focuses on the structuring of these relations and seeks to identify both their causes and their consequences (Tichy *et al.*, 1979). The conceptual origins of the network approach can be attributed to three major schools of thought namely sociology (Park 1924; Simmel, 1950; Cooley, 1956; Parsons, 1960; Mitchell, 1969), anthropology (Frazer, 1919; Malinowski, 1922; Levi-Strauss, 1969; Homans, 1961; Blau, 1964; Ekeh, 1974) and role theory (Katz and Kahn, 1966; Kadushin, 1968). Empirically, Whyte (1955) and Chapple and Sales (1961) were among the first researchers to use network concepts. Large-scale studies on electoral behavior and dissemination of innovations have encompassed network concepts (Katz & Lazarsfeld 1955; Coleman *et al.*, 1957; Rogers and Shoemaker 1971). On the experimental level, the studies of Bavelas (1951) and Leavitt (1951) explicitly designed the structure of the group in terms of the network.

Further, network society theory argues that the current society constitutes a new type of social structure characterized by two emerging social forms of time and space. These are timeless time and the space of flows. Timeless time is defined by the use of new information technologies (Castells, 2000). The space of flows organizes the simultaneity of social practices at a distance, by means of telecommunications and information technologies. The space of flows is not placeless. It is made of nodes and networks which are connected to the space of places. The space of places is the material support of time-sharing social practices where meaning, function and locality are closely interrelated (table 1). The distinctive feature that network society depicts is that most processes, including power concentration, wealth creation and distribution, and information exchange are organized in the space of flows. Networks can be seen as an organism where all the individual units (nodes) of the network cooperate to achieve their goal (Castells, 2000). Flows are the streams of information and other resources between nodes circulating through the channels of connection between nodes (Castells, 2004). Networks are very old forms of social organisation but only with the recent development have they become the dominant form of social organisation. On the one hand, networks are flexible and adaptable forms of organisation, able to evolve with their environment and with the evolution of the nodes that compose networks. On the other hand, networks have considerable difficulty in co-ordinating functions, in focusing resources on specific goals, and in managing the complexity of a given task beyond a certain size of the network (Castells, 2000). Below, three key concepts of network society theory are presented in more depth: governance arrangements, cooperation and power relationships.

Table 1. The five functions of the network

Function	Purpose	How does the network carry out this function ?
Knowledge Management	Identify, filter and share important people, events, facts and stories; stimulate learning; mitigate information overload	Share information through websites; contribute to or edit a newspaper or newsletters; dissemination of ideas; narration; mentoring
Amplification and advocacy	Extend the scope and influence of the constituent parts (members, ideas, initiatives)	Hold conferences, organize campaigns, offer extension services, the ripple effect
Community building	Building of social capital through links, building relationships of trust; Consensus and coherence; collective learning and action between homogeneous actors	Organize learning, networking or meetings; create opportunities to collaborate with others; provide space for open discussions
Convening	Building social capital through bridging; stimulate conversation, interactive learning and action between heterogeneous actors	Organize formal multi-stakeholder meetings / decision-making meetings, allowing reputation in association, identification and connection of new or emerging ideas
Resource mobilisation	Increase the capacity and efficiency of members, stimulate the generation of knowledge and innovation	Offer training, grants, sponsorship, consultancy and advice; provide access to databases and libraries

Source: Hearn and Mendizabal (2011)

NETWORK COOPERATION

According to Castells (2004), cooperation in networks is based on the ability to communicate. This ability depends on the existence of codes of translation and inter-operability between networks (protocols of communication), and the access to connection points (switches) (Castells, 2004). Cooperation has become a key issue in the network society. For instance, economic networks establish alliances, agreements and joint ventures in order to have access to profitable markets and to be able to compete (Castells, 2000). Similarly, RRCs are connected in networks. Such networks are often established for the purpose of specific business projects, e.g. a particular technological innovation, and disappear or are modified into another network as soon as the project is finished (Castells, 2000). The unity of the innovation process is not the firm but the business project. The firm becomes a node that is part of global economic networks and flows (Castells, 2000). Network society theory acknowledges cooperation between environmental networks and business networks. None of the actors involved in the networks has the capacity on its own to bring about the changes necessary for sustainability of RRC.

NETWORK POWER RELATIONSHIPS

Power is understood in this research in terms of flows of resources, connections and values.

Particularly, resources are exchanged through the networks as flows of information, funding and technical expertise. The capacity to be resourceful and allocate resources puts actors in position of power. What resource is powerful and powerless is defined by key actors. Key actors also known as stakeholders are the power holders in the networks, performing as network nodes. As influential actors, they are in best position to influence the aim and the configuration of the networks. This is the case with RRCs customers of seed, which shows that some nodes are more important than others, but they all need each other as long as they are within the network (Castells, 2000). Nodes increase the importance for the network by absorbing more relevant information, and processing it more efficiently. The relative importance of a node does not stem from its specific features but from its ability to contribute to the network goals (Castells, 2004). Networks have no centre and actors share decision-making (Castells, 2000). While some actors have a greater degree of influence than others, there is never an absolute power or zero degree of influence of one actor over another (Castells, 2004). Networks make it practically challenging to exercise hierarchical power without processing instructions in the network, according to the network's rules. While hierarchical power implies a chain of command among actors, democratic power following the base of pyramid approach implies a shared decision making among actors.

Thus, in the network society, power is redefined, but it does not vanish. Network nodes are the key actors and because of their position in the social structure, they exercise power in the network society (Castells, 2004). The power relationships in networks are also related to the dynamics of domination and of resistance to domination. Power relationship is particularly central in the social structure of production and consumption (Castells, 2000). Political institutions are not the main site of power any longer. The more decisive power is the power of information and communication flows, and cultural codes embedded in networks

(Castells, 2000). Actors, embedded in the social structure of the network society, influence the relationships of production and consumption by enacting, reproducing or transforming it. Thus, the nodes are generally the social actors (individuals) in the network; but, they can also represent institutions or organisations, and the links are the relations between these nodes. There are also several types of links between nodes (Grandjean, 2014). Moreover, Wasserman and Faust (1994) argue that the actors and their actions are seen as interdependent instead of being independent and autonomous units, while the links between the actors are transfer channels or flow of resources (material or immaterial).

Gamboa et al. (2010) add to this by saying that the people we interact with can influence our own ideas and decisions because the spread of ideas flows through networks of social interaction, and that it is due to disparities in the social structure of communities regarding modes of communication on agricultural innovations. It is to these effects of network exposure and how it influences access to the information needed to adopt innovation that we now turn in an attempt to develop a more grounded theoretical approach.

METHODS

We adopted a micro-level ethnographic approach to understand experiences of rural resource centres and their network. Our data collection focused on understanding the requisites necessary for the sustainability of RRC. We also wanted to understand how strong partnerships helped RRCs to be adequately resourced in search of sustainability. Our ethnography involved participant observation, focus groups and in-depth interviews and was conducted by a team of researchers and their locally based associates

THE STUDY SETTING AND SAMPLE

Fieldwork was conducted in two rural resource centres in the Western Highlands. One located in the Nde Division, “CIEFAD¹” and the other in Momo Division “KUGWE” (Figure 1):

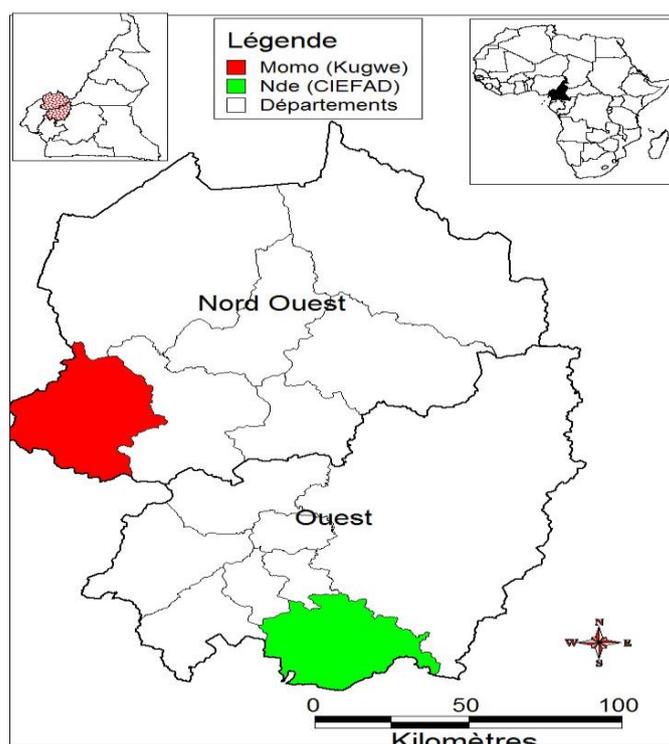


Fig. 1. Localisation of CIEFAD and KUGWE RRC

Source: Adapted from Takoutsing et al. (2014b)

¹ « integrated experimental and training centre in sustainable development »

The western uplands area covers the highlands of the western and northwestern regions of Cameroon, which present similarities in terms of biophysical, human, economic and cultural aspects. It is between 4 ° 54 "and 6 ° 36" north latitude and between 9 ° 18 "and 11 ° 24" east longitude. This area has a total area of approximately 3.1 million hectares (representing 1/6 of the national territory). It offers a great variety of reliefs: around 1,240m above sea level for the Bamoun plateau, 2,740m for the Bamileke plateau up to Mount Bamboutos and 1,800m for the Bamenda volcanic plateaus. Here we encounter savanna vegetation, stepped plateaus and plains crossed by gallery forests (IRAD 2008, Achancho 2012, Takoutsing et al., 2013). In addition, the climate is of the "Cameroonian altitude" type. It is marked by two seasons of unequal length: a dry season, which goes from mid-November to mid-March, and a rainy season that lasts from mid-March to mid-November. Mean temperatures are low (19 ° C) and heavy rains (1300 - 3000 mm / year) fall in a monomodal configuration. Pedoclimatic conditions are conducive to agricultural activities (high altitude climate, fertile volcanic soils, hydro-morphic soils, ferralitic soils). This leads to a very high population density mainly agricultural whose average is about 114 inhabitants / km² (IRAD 2008, Achancho 2012, Takoutsing et al., 2013). The populations of this zone practice a variety of crops such as coffee (Coffee sp), corn (Zeamays), rice (Orizasativa), potato (Solanumtuberosum), tomato (Lycopersicumexculentum), common beans (Phaseolusvulgaris), yam (Discoreasp), safou (Dacryodesedulis), bitter kola (Garcinia Kola), okok or eru (Gnetum africanum) (IRAD 2008, Eboutou 2013, Kenfack 2014).

We wish to point out here that the methodology used for data collection and analysis is the analysis of social networks which focuses on relations between actors rather than focusing on individuals (or organisations) and their attributes as this is often the case in some studies in the social sciences. This implies that the actors studied in the analysis of social networks are not usually sampled independently of their relations. In this study, we analyse the relations (resource flows) between rural resource centres (RRCs) and their partners, which are the actors (or nodes) and resources exchanged between the actors represent the links.

TARGET POPULATION

Our study population is made up of RRCs and their stakeholders. We recall that there are currently six RRCs (table 2) that are functional in Cameroon namely MIFACIG (Mixed Farming Common Initiative Group), RARC (Riba Agroforestry and Resource Center), KUGWE, PROAGRO (Producteurs Agropastoraux), CIEFAD and CIMAR ("Centre d'Insertion aux Métiers Agricoles et Ruraux").

Table 2. The six functional rural resource centres in Cameroon

#	RRC	Head office	Division	Region
1	CIEFAD	Feutap	Nde	West
2	CIMAR	Njombe	Mungo	Littoral
3	KUGWE	Kugwe	Momo	North West
4	MIFACIG	Belo	Boyo	North West
5	PROAGRO	Bayangam	Koung -Khi	West
6	RARC	Kumbo	Bui	North West

Source: Adapted from Ngaunkam (2012)

Table 2 reveals that the vast majority (nearly 83%) of functional RRCs are concentrated in the western and northwestern regions of Cameroon. Thus, in the context of this study, we only worked with two RRCs (see Table 3, CIEFAD and KUGWE) and their different partners taking into account the financial constraints, the time allocated to this research work and other considerations concerning inter alia (i) the diversity of partners; (ii) frequency of exchanges with these partners; (iii) the accessibility of RRC; (iv) and the number of producer organisations (POs) supervised. Moreover, we wanted to have from our target population a representative sample (of RRCs and their traditional stakeholders) that should allow us to draw valid conclusions.

Table 3. KUGWE and CIEFAD RRC with their different partners

RRC	Partners	Categories of partners	Number of supervised groups
KUGWE	ICRAF GIZ, Peace Corps SDS, municipalities PO, producers Newspapers, radios Elites, economic operators High schools, secondary schools Churches	Research centres Development organisations Policy and Strategy Direct beneficiaries Media individuals Educational institutions Religious institutions	08
CIEFAD	ICRAF SNV AFOP, SDS, municipalities POs, producers Elites, economic operators High schools, secondary schools ETA, CRA, EFA, FASA	Research centres Development organisations Policy and Strategy Direct beneficiaries individuals Educational institutions Agricultural establishments	18

Source: Author's compilation based on recent research (Eboutou, 2013; Kenfack, 2014) on RRCs in Cameroon

DATA PROCESSING AND ANALYSIS

After the data collection, the primary purpose of the analysis was to make sense of the themes emerging from ethnographic data, which consisted of transcripts of interviews and focus groups, our reflective diary, as well as personal notes and participant observations. We followed a two-stage approach in analyzing data. The first stage involved the creation of two databases in the Excel Professional Plus 2013 software. The first database is about the links information of the RRC stakeholders and the second database looks at the attributes of these stakeholders. The second stage involved combining these two databases into a single file. Finally, we transferred this file to the Netdraw software version 2155 to visualize and analyze existing social networks in the context of rural resource centres in Cameroon. Thus, to meet our research objectives, the sociometric data collected served to represent and to make a comprehensive qualitative analysis of the social networks developed around the chosen rural resource centres.

FINDINGS

In giving meaning to the data, we drew on theoretical perspectives from the network society literature. In reading and analyzing the transcripts of our interviews, observations and focus groups, strategic partnership emerged as key theme that described RRCs' experience of sustainability.

We present here the main actors involved in the RRCs in Cameroon. We grouped them into three levels of intervention in Table 4.

Table 4. Key stakeholders of CIEFAD and KUGWE RRCs

Levels of intervention	Types of actors	functions
Upstream	Sectoral ministries, particularly through their decentralized services, local authorities, development partners (development organisations), research centres, universities	Provide institutional, strategic, financial, technical and material support
At the same level	Rural Resource Centres	Share information and experiences
Downstream	Producer organisations, municipalities, technical schools and faculties of agriculture, community radios, primary and secondary schools, private individuals	Benefit from the services offered by rural resource centres

Figure 2 allows us to visualize the social networks developed around these RRCs.

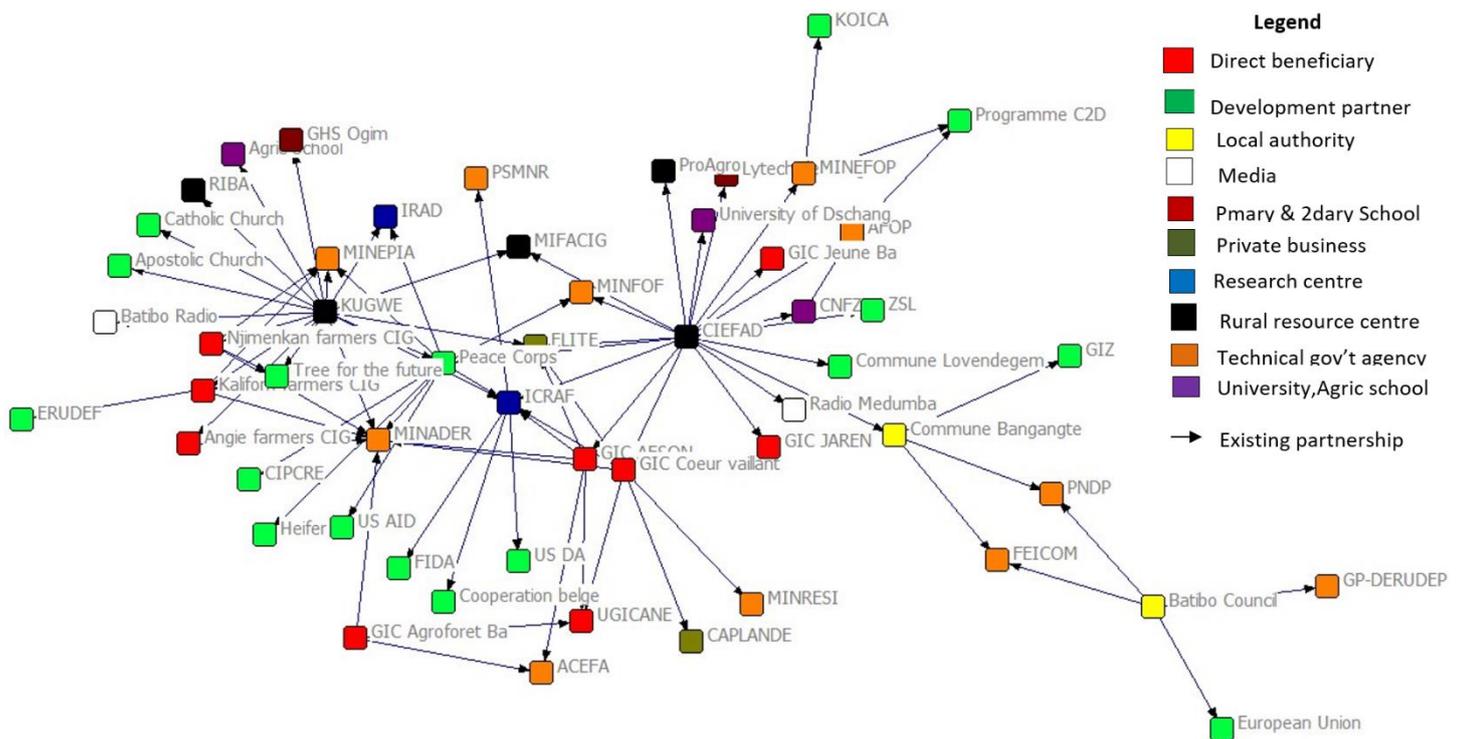


Fig. 2. Social networks developed around the CIEFAD and KUGWE RRCs

Figure 2 highlights a sociogram representing the links (blue arrows) between the different categories of actors (square shaped nodes of various colors: red = direct beneficiaries, green = development partners, yellow = local authorities, white = media, black = rural resource centres, blue = research centers, purple = universities and technical schools of agriculture, accented orange = sectoral ministries and the Cameroonian state programs, light brown = secondary schools, green accentuated = companies and individuals) intervening around CIEFAD and KUGWE. It represents a network where we noted two types of interaction namely the exchange of information and knowledge and the exchange of goods or services. Also, we noted that the links between the actors are dynamic and go in both directions. As a result, the one-way blue arrows on the sociogram are only indicative of the existence of a relationship between the actors involved.

The links between the nodes are reciprocal in the network. In addition, an analysis of this network reveals that its size is 55 (we have 55 actors participating in the network) and its density is 251 meaning that we have 251 effectual links in the network. Moreover, we reported in the network the formation of two main dense regions (clusters), which denotes that these two RRCs have developed a diversity of partnerships in their socio-cultural, economic, political and institutional environment. Also, the network offers more links scattered around these nodes leading to a centralized network.

Furthermore, we noted a high degree of centrality of CIEFAD in the 'cluster' of which it is a member (CIEFAD is in relation with all the actors of this cluster). The same applies for KUGWE. This can be justified by the fact that the extension approach known as "rural resource centres" places these grassroots organisations at the center of any rural intervention aimed at improving the well-being of the people. Nevertheless, CIEFAD appears to be the network star (the node with the most relations) because it is connected to 21 nodes. This characteristic of CIEFAD is certainly due to its dynamism in the search for partners that can help carry out its activities with the support of its proponent namely NGO APADER. While KUGWE is less oriented towards the search for partnerships, it is much more accentuated in the production of agroforestry tree seedlings and the provision of agricultural extension and advisory services. This is attributed to his proponent who doubles as a senior agricultural technician and MINADER staff. CIEFAD and KUGWE are gatekeepers because they allow direct beneficiaries to be linked to certain actors with whom they are not directly linked such as ICRAF, Peace Corps, AFOP program, Dschang University, the CNFZV among others. This can be explained by the fact that these two RRCs are considered as relay organisations. Nodes such as ICRAF and Peace Corps are bridges (actors belonging to several clusters) because they intervene at the level of the KUGWE RRC as well as the CIEFAD. We do not observe any isolated node in the network, which means that all the actors have dynamic links. Finally, we recall that all the relations between the actors in the network are not identical.

NATURE AND STRENGTH OF THE LINKS OF CIEFAD AND KUGWE

We emphasize that RRCs offer several types of services, which the most important are (i) quality seed and seedlings, (ii) training of farmers in a wide variety of areas including nursery establishment, vegetative propagation techniques, soil fertility management, group dynamics, etc., (iii) information on innovations and new technologies, (iv) links with market actors including the private sector, (v) access to market information and opportunities for micro-finance, (vi) platform for the exchange of information between farmers, and between farmers and other stakeholders (Degrande *et al.*, 2015). Thus, to ensure their viability and sustainability, these RRCs are called upon to develop multiple partnerships to support them in fulfilling their mission statement. Toward this end, we endeavored to highlight on a sociogram the different types of existing partnerships in the studied RRCs namely CIEFAD and KUGWE.

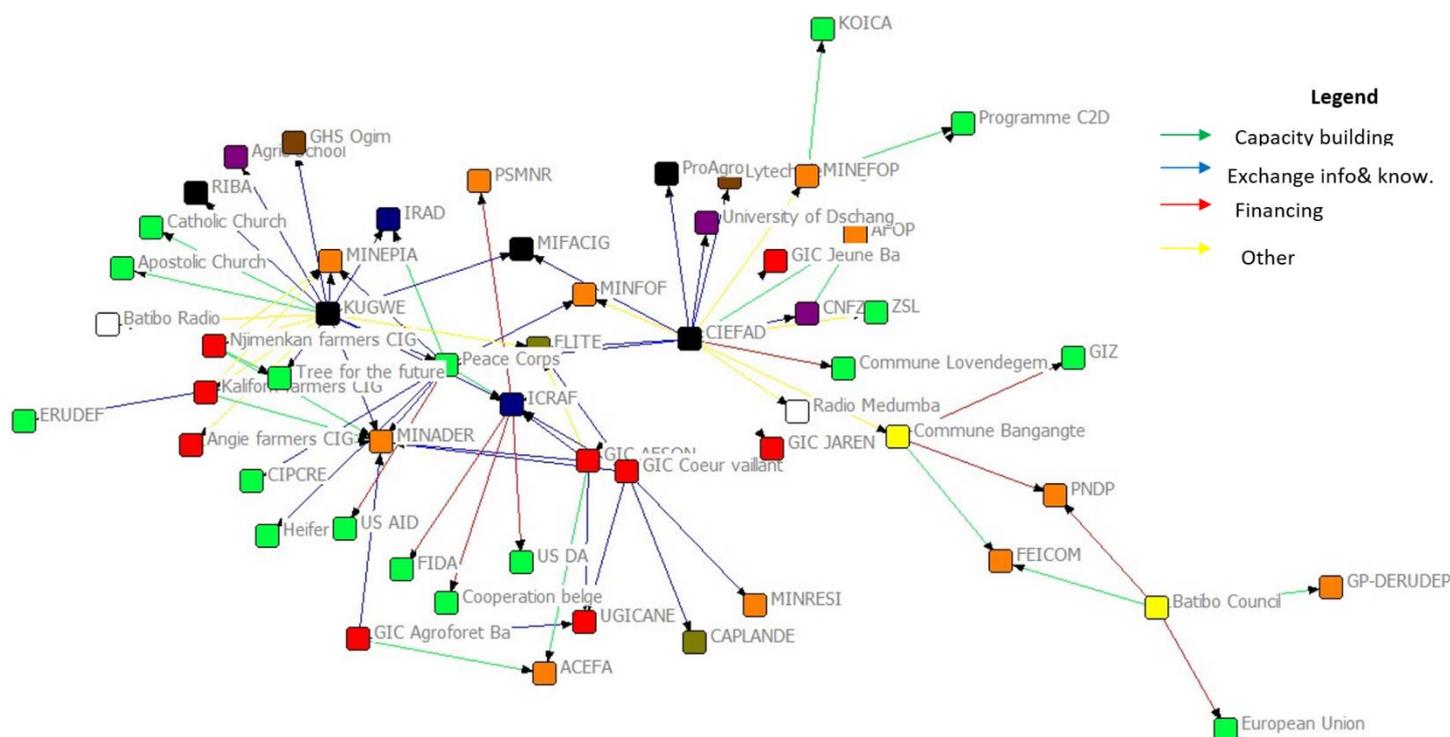


Fig. 3. Types of existing partnerships in the studied RRCs

Figure 3 highlights the different types of partnerships between network actors (white arrow = strategy development and / or activity orientation, green arrow = capacity building, blue arrow = information and knowledge exchange, red arrow = financing, yellow arrow = others). On one hand, the analysis of this figure reveals that CIEFAD has a great deal of partnerships:

In short, we realize that the CIEFAD and KUGWE RRCs have developed a diversity of partnerships in their socio-economic, political and cultural environment. But, we observe some disparities between these two RRCs. Indeed, the CIEFAD is already truly turned to resource mobilisation (diversification of sources of funding and technical assistance, conception of credible and viable projects, etc.), which is essential for its short viability and sustainability, This is not yet the case for KUGWE, whose focus is much more on the production of agroforestry tree seedlings, their extension and the organisation of technical training aimed at reinforcing producer skills. Thus, we emphasize for example that the CIEFAD has a partner namely the council of Lovendegem who brings in annually since 2008 a financial support to ensure the good functioning of the partnership; while KUGWE does not have one. These differences between these two CRRs may justify the fact that KUGWE sometimes finds it more difficult to finance its activities in relation to CIEFAD, which is currently a structure that has made considerable progress towards its autonomy and sustainability. This could also be explained by the fact that CIEFAD is an older rural resource centre than KUGWE, thus having a greater experience in conducting the activities of a RRC and facing up their daily realities. In addition, we also note a shortage of skilled and qualified human resources in KUGWE. As a result, the coordinator of this center is practically the jack of all trades, which limits it enormously, especially in the setting up of viable and credible projects or the diversification of its sources of financing.

TOWARD STRENGTHENING EXISTING PARTNERSHIPS IN CIEFAD AND KUGWE RRCs

Our field surveys generally indicate that RRCs have much to gain by effectively partnering with the ANACRAAD² to better defend their common interests and to face their difficulties. In addition, respondents unanimously state that these centers can also set up viable and credible projects to implement together. Thus, all this will help to strengthen their collaboration and their effectiveness at the national level. More specifically, the majority of respondents believe that it is wise for the RRCs of CIEFAD and KUGWE to initiate annually, as far as possible, the establishment of an economic partnership with their various customers of agroforestry tree seedlings. This will further strengthen their partnership with individuals and allow them to stabilize the income from the sale of seedlings. In addition, they state that the managers of these centres will gain access to the services of the ministry of agriculture and rural development (MINADER, French acronym) and the institute of agricultural research for development (IRAD, French acronym) in charge of the production and multiplication of agricultural seeds. This to gauge to what extent the RRCs can become centres of multiplication of certified seeds because they have several assets in this area. It will also enable them to generate more income through the sale of agricultural seeds. In addition, this partnership can also help obtain funding through joint venture with research institutions such as University of Dschang (UDs). In the same vein, most interviewees believe that CIEFAD should continue as much as the opportunity arises to build viable and credible social projects and submit them for funding to donors, development agencies, Cameroon's state programs and local elites to perpetuate its impact in the society. Further, CIEFAD will have to offer more services according to its possibilities by applying for tenders for consultation related to its areas of competence at the local and national levels. This will allow him to consolidate his achievements. KUGWE, meanwhile, according to the respondents, should follow the steps of CIEFAD particularly with regard to the setting up of projects and the search for financing as well as the provision of services in order to establish its viability and to make real progress towards its sustainability. In addition, KUGWE will have to further vulgarize its activities and services through Batibo community radio Batibo to be better known by local people representing potential customers. Thus, it will also be able to initiate a technical assistance partnership for this radio in the production and presentation of programmes related to agriculture and rural development to better communicate with the local populations, most of them farmers.

From the institutional point of view, we note from our interviews that CIEFAD stands a better chance to finalize their current accreditation procedure with the ministry of employment and vocational training (MINEFOP, French acronym) in order to benefit from a grant from this ministry as well as the technical and material support of its different partners. These include the Korea International Cooperation Agency (KOICA) and the French Debt Development Contract (C2D, French acronym) program. For its part, it appears that the coordinator of KUGWE will first initiate a partnership with the support program for the renovation and development of vocational training in agriculture, livestock and fishing (AFOP, French acronym) which can help it among others in the development, rehabilitation or construction of its resource center and in funding training activities of the centre. Then, he will be able to initiate his approval procedure by MINEFOP because this approval will also bring him a lot in his progress towards sustainability.

IMPLICATIONS AND FUTURE DIRECTIONS

As a reminder, this study targeted CIEFAD and KUGWE RRCs and their identified partners. Although we have only worked with these two CRRs out of the six functional ones in Cameroon, we believe that the results of this study can be generalized to a greater extent to other functional RRCs. Besides, the main actors within the RRC are grouped into three levels.

Upstream: sectoral ministries, particularly through their decentralized services, local authorities, development partners (development organisations), research centres, and universities provide institutional, strategic, financial, technical and material support to the rural resources centres;

At the same level: rural resource centres share information and experiences; and

Downstream: Producer organisations, municipalities, technical schools and faculties of agriculture, community radios, primary and secondary schools, and individuals benefit from the services offered by rural resource centres.

We observe, among other things, that the interactions of RRCs with development organisations, research centers, municipalities and individuals have an influence on their organisational and financial sustainability. Our findings suggest that RRCs should as much as possible (i) further initiate and formalize partnerships with upstream actors, and (ii) provide services and win-win partnerships with seed/seedling customers to build sustainability. Figure 4 below has been proposed as a viable institutional

² National association of rural resource centres in agroforestry and sustainable agriculture

architecture that can allow RRCs to accelerate the process of their empowerment and ensure the sustainability of their provision of services.

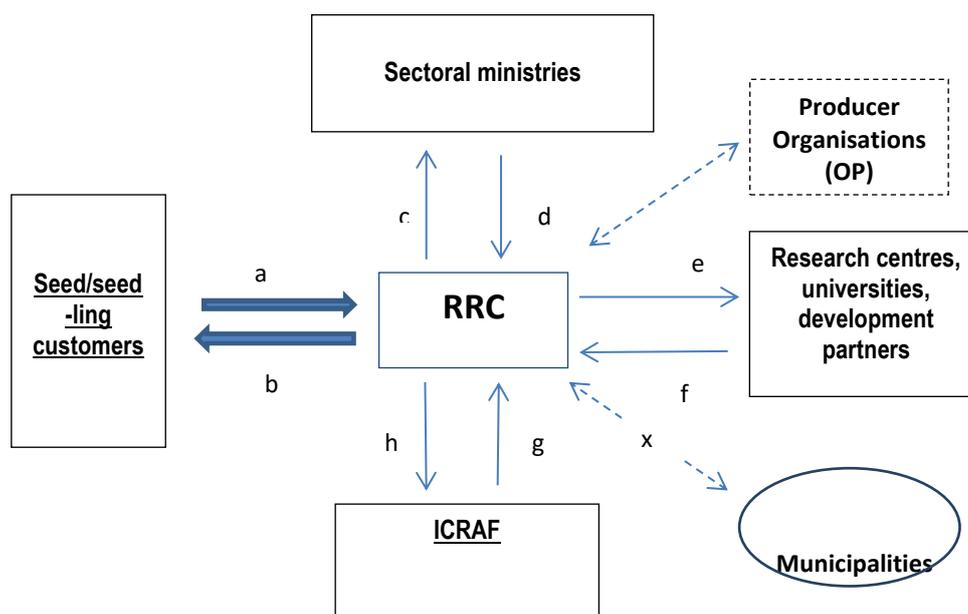


Fig. 4. CRR Sustainability Platform

Table 5 below lists the added value elements that underlie the existing interactions between the RRC and their strategic partners.

Table 5. Interactive elements that condition the sustainability of CRRs

Arrow	Attribute	Hypothesis
x	RRCs and municipalities establish a dynamic partnership in which the former implement activities (work opportunities for young people, protection of the environment) which are part of the political agenda and the missions of the latter.	Both institutions appreciate the symbiosis of their respective actions
a	Seedling customers communicate new data and / information on plant material; or require specific advice from RRC	RRC has expertise in the production and exploitation of plant material
b	RRC produces plant material and provides strategic advisory support to local seedling customers.	RRC benefits from ongoing capacity building program in crop production
c	RRCs establish communication bridges with the relevant sectoral ministries and put their actions on the agenda of these ministries	The managerial staff of the RRCs is well informed about the schedule of activities and other major events of the relevant sectoral ministries
d	Sector Ministries share strategic directions and the nature of their interventions at the national level	Sector ministries recognize the impact of RRC actions at the local level
e	The RRC solicits the results generated by the research activities, or creates frameworks of research works putting to the contribution the university expertise within the framework of internship and other specialized works	The RRC has the directory of research centers including their expertise and scientific production, as well as the directory of active researchers
f	Research centers disseminate research results and new data accessible to RRCs	The RRC agenda on plant material production and their priorities in this area are well known
g	ICRAF should provide even more substantial support to RRCs for the implementation of their projects	RRCs have developed a real ability to absorb funding
h	RRCs inform ICRAF about investment priorities and submit viable projects to accelerate their empowerment	ICRAF relies more on RRCs and their opinions

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Herve Wouapi: Writing – original draft, review & editing. Writing the Methodology section and Conceptualization.

Charles Tchomkachue: Writing – original draft, review & editing, Methodology, Conceptualization.

Ann Degrande: Writing - original draft.

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