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Participatory Livelihood Analysis as an Alternative Method for Agricultural Extension Needs-Assessment: Case of a Rural Community in Kenya

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Author's contribution

The sole author designed and implemented the study to completion.

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ABSTRACT

The well-being of the rural population globally has been associated with the performance and resilience of the agriculture sector. The sector continually requires new needs-based knowledge and technologies. It has become necessary to empower the rural communities through a wider bottom-up system that directly addresses their needs. This paper explores the application of little-used Participatory Livelihood Analysis for the adoption and up-scaling of its use in the assessment of agricultural-extension-needs for disadvantaged rural communities. It presents a case study of a village perceived by Agriculture stakeholders as disadvantaged in Nandi County, Kenya. Using a case study design and a participatory livelihood analysis approach, the descriptive study analyses the pentagon of resources (Natural/Land, human, social, physical and financial) based on the sustainable livelihood framework. It identifies livelihood strategies, constraints and opportunities for improvement on the performance of the livelihood strategies. The study observed that the Participatory Livelihood Analysis approach was an effective method in the assessment of agricultural-extension-needs of disadvantaged communities in relatively remote locations. Further trials of the approach in similar socio-economic contexts for use in needs assessment are recommended.

Keywords: Sustainable livelihood framework; extension needs assessment; participatory livelihood analysis.

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ABBREVIATIONS

DFID: Department for International Development; ICRAF: International Centre for Research in Agro-forestry; PLiA: Participatory Livelihood Analysis; PRA: Participatory Rural Appraisal.

1. INTRODUCTION

1.1 Background Information

The well-being of the rural population globally has been broadly associated with the performance of the Agricultural sector and its resilience. Its performance has been linked to a continued supply of new information, knowledge and technologies [1]. To increase the efficiency of the agricultural extension system that supplies this new knowledge and technologies it has become necessary to empower the rural communities through a wider bottom-up system that directly addresses the needs of the beneficiaries [1]. This requires a continual assessment of the needs of the beneficiaries. The principle function of needs assessment in agricultural extension is to identify the needs of the target community and the underutilised resources. An agricultural extension plan or program must begin with the needs and interests of the people for it to be effective in the dissemination of information, knowledge and agricultural technologies [2] and to change the attitudes and inspire the people. The needs assessment helps to identify areas that will do the most good for the most people over time [3]. The ultimate goal is to generate effective program planning by constructing an objective picture of the needs of the community. The needs assessment involves the collection, analysis and synthesis of data [3]. The steps undertaken in such a needs-assessment may require a review of existing data. The use of key informants to provide some perspectives and conducting individual interviews are also valuable tools in the process of needs assessment. Some authors have recommended the use of group methods such as advisory or stakeholders committees and focus group interviews. The focus group interviews tend to lend themselves to open-ended questions to facilitate in-depth data collection. Sample surveys of the general population can also gather information and data regarding the Extension needs of a target community. Another method commonly used is the Delphi method. The Delphi method uses a nominated group of experts to extract ideas on the needs of a population through a series of questionnaires [3]. This Delphi technique uses a diverse group of participants to analyse the needs of a community.

The evaluation of the information needs of farmers is alternatively, accomplished through meetings and farm visits, use of diaries to record farmer's problems, exchanging and sharing ideas with other extension providers and carrying out a participatory rural appraisal. The Participatory Rural Appraisal (PRA) methodology comprises a flexible set of context-specific techniques. The flexible set of PRA tools includes the use of physical maps, social maps, transect walks, wealth ranking, Venn diagramming, preparation of seasonal calendars, matrix ranking, matrix scoring and problem tree analysis [4]. From this family of PRA tools, modifications have emerged, ostensibly because they have the advantage of involving the beneficiaries in the needs assessment by the inclusion of the beneficiaries in the decision-making process. One such emergent offspring of the PRA family of tools is the analysis of livelihoods through participatory methods; the concept of the livelihood approach. The Participatory analysis of Livelihoods borrows heavily from the stages-of-progress model that was developed by Anirudh Krishna of the Duke University of USA [5]. The tools aren't widely used in planning processes despite its advantages of beneficiary-involvement [5]. The Participatory Livelihood Analysis is a people-centric approach with a focus on the disadvantaged. It employs a lens of sustainability and dynamism in the livelihoods of the people [6]. The Participatory livelihood analysis is an advancement of participatory rural appraisal; improved through the incorporation of the livelihood approach as advanced by DFID [7].

The concept of the livelihood approach is referred to in this paper as Participatory Livelihood Analysis because of the community participation component. It has its origins to the shift in the 1980s from focusing on economic growth as an indicator of human-prosperity to a focus on the well-being of humans and the sustainability of the results [8]. The function of the livelihoods approach by design was primarily to focus on the poorest in society. The focus on the poorest in society is historical. Robert Chambers, in his book first published in 1983 on Rural Development runs the theme of 'Putting the Last First' and argues for the shifting of power 'downwards and outwards' [9]. The author argued that change agents such as Agricultural Extension agents, can better be seen as

enablers; enabling those who are poor, powerless and remote to control more of their lives, their choices and to demand and use more services. This argument by Chambers in the 1980s appears to be relevant to-date. The use of Participatory Livelihood Analysis is consistent with these arguments.

The approach identifies natural, material, human and social assets that determine the people's livelihoods in the context of their environment where their livelihoods are influenced by policies and institutional developments [10]. Through the livelihood approach, the processes of change in a community are analyzed based on the physical assets in use and the processes used in transforming the assets into outcomes that can be regarded as sustainable [11]. According to [12] Livelihood is said to be sustainable when it can cope with stresses and shocks and be able to recover from them. Authors [13] clarifies that livelihood is socially sustainable when it can cope with stresses and shocks as explained by [12]. However, the sustainability element also means that consideration of ecologic factors is given weight and livelihoods are said to be environmentally sustainable when they maintain the assets on which they depend [13].

The primary purpose of the analysis based on the livelihood approach is to generate an agenda for action. The approach does not look for problems or constraints, but rather looks for opportunities from what the poor are already engaged in [14]. The authors have referred to what the people are doing without external intervention as "immanent" development, and the people would continue doing it for purposes of meeting their self-defined benefits in their livelihoods with or without external intervention. The Participatory Livelihood analysis is interpreted to mean collaboratively understanding the patterns of lifestyle choices made by individuals in a community, amalgamating them to provide a clear pattern on how they have changed over time and how they are expected to change into the future. The choices made by individual households are influenced by the prevailing political and economic situation, natural and physical assets available as well as human and social assets [15,16]. This Livelihood framework is based on the philosophy that most people want to survive first and only think of prosperity later as argued by [14]. Available literature suggests that there is no universal approach to the application of the Sustainable Livelihood Framework [10]. The framework can be used as a program planning tool or as a program in itself [10]. The current study proposes its use in the assessment of Agricultural Extension needs of rural communities. This paper reports a case study that was conducted in a village of Tinderet Sub County of Nandi County in Kenya, based on the sustainable livelihood framework.

As explained by several authors, Livelihoods can be regarded as socially sustainable if they are able to bounce back after major shocks and stresses in which naturally people have no control over [12,13,15,16]. When a community has an inadequate capacity or capability to react and mitigate against the impact of these shocks and stresses, then vulnerability becomes evident [17]. According to [15], the pentagon of resources constitutes the capabilities based on which livelihoods are determined. Their seasonality, however, constitutes risk factors that create vulnerabilities. Jensen [16] have argued that diversified livelihood is less vulnerable than a less diversified one. Meanwhile, the institutional and policy contexts as illustrated in Fig. 1 present exogenous factors that determine the peoples' options on how they use their resources to generate livelihoods [15].

1.2 Sustainable Livelihood Framework (SLF)

The livelihood framework, more appropriately referred to as the Sustainable Livelihood Framework (SLF) is a study lens that focuses on the 'immanent' activities of a community as referred to by Cowen and Shanto (1998) as cited by [14] in relation to activities which are carried out by the community devoid of any significant intervention from the outside. The assumption of minimum intervention from outside suggests that the study area selected is usually an apparently vulnerable, marginalized community in the eyes of outsiders. According to [9], typically poor rural villages are those outside the common view of the visitors; poor villages often are off the road and concealed from view since wealthier households use their economic and social power to obtain roadside homestead sites, relegating the poor to the periphery. Author [9] described disadvantaged rural people as those where the poverty of the whole community is linked to their remoteness or inadequate resources, or both. Consequently the disadvantaged have very poor access to services and information and perpetuate their livelihoods with little or no intervention from outsiders including government departments.

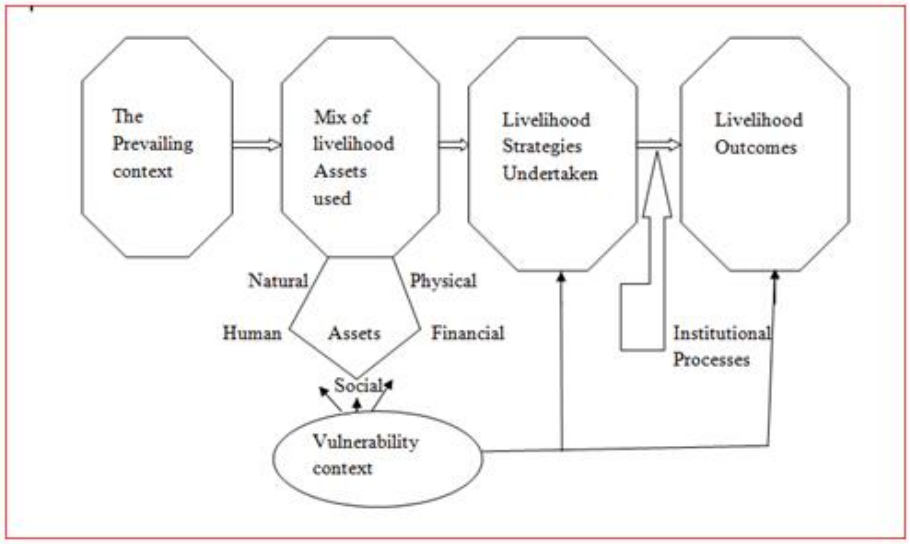

Fig. 1. Sustainable livelihood framework (adopted from scoones, 1998)

The current study employed a participatory process involving a Sub-county Agricultural stakeholders' forum to identify a community that was disadvantaged on the basis of a criteria developed by the forum based on access to services and resource levels. The purpose of the study was to assess agricultural extension needs of the community through a Participatory Livelihood Analysis approach based on the sustainable livelihood framework. The specific objectives of the study were; to identify a disadvantaged community among smallholder farmers in Tinderet Sub County of Nandi, explore the application of Participatory Livelihood analysis in the assessment of their agricultural-extension-needs and to identify the agricultural extension needs of the disadvantaged community. The results of the study are of significance to agricultural extension service providers and rural development stakeholders.

1.3 Participatory Livelihood Analysis Approach

Participatory livelihood analysis approach is a flexible approach based on the sustainable livelihood framework [18]. One widely used version is the Participatory Analysis of Poverty and Livelihood Dynamics (PAPOLD). The approach has been used in several agricultural and forestry projects in Burkina Faso, Vietnam and Kenya (Hoang & Nguyen, 2011 as cited by [19]. It has been particularly used to identify intervention-needs of vulnerable households and to assist the smallholder farmers to commercialize their products [19].The approach focuses on an analysis of the livelihood strategies adopted by households to meet their self-defined goals. According to [20], a livelihood strategy is a combination of household assets or resources and activities undertaken by the households based on them. These livelihood strategies are viewed in terms of households' overall context; economic, social and natural environment [20]. The analysis is carried out in collaboration between development agents and the farmers. During the process, farmers rank their activities, problems and impacts [20]. The author reported the use of the approach in monitoring and evaluation in the central highlands of Vietnam.

During the implementation of the National Agriculture and Livestock Extension Program (NALEP) in Kenya, the Participatory Analysis of Poverty and Livelihood Dynamics (PAPOLD) was widely used for planning agricultural interventions targeted at the poor and vulnerable members of the society [21]. Some authors have suggested that the Participatory livelihood analysis based on the sustainable livelihood framework is an effective approach in accessing the often-neglected members of a community [22]. The current study utilizes this flexible approach in the identification of agricultural extension needs of a perceived disadvantaged community.

The use of Participatory Livelihood Analysis provides a foundation for designing and developing agricultural extension programs that address the priority needs and interests of the

farmers [23]. On the basis of their experiences with the approach, [23] recommended the inclusion of the livelihood analysis tools in the training modules for extension agents in Nigeria. The International Centre for Research in Agro-forestry (ICRAF) developed and promoted the use of the Participatory Analysis of Poverty and Livelihood dynamics (PAPOLD), based on the livelihood framework, as a survey method to identify the needs of poor and vulnerable households [24]. The tool was also used in the identification of options to be used by Agricultural Extension agents to help the poor and vulnerable households develop themselves [24].

Participatory Community Analysis, also based on the five capitals of the livelihood framework was deployed by [25] to identify challenges to the Ethiopian smallholder farmers' livelihoods. The Participatory Community Analysis was effectively used to identify smallholder farmers' needs, trends in their livelihoods, constraints and opportunities as a first phase in a Participatory development approach in the Ethiopian Highlands. The authors credited the approach with producing actionable information. Apart from providing the required information, the framework was effective in building relationships between development agents and the community to improve food security and livelihoods [25]. This community-based survey approach not only unearths agricultural extension needs, but also unearths other rural development aspects [18]. Authors [18] utilized the participatory analysis tool to assess the impact of a forest management intervention on livelihoods in West Bengal. According to the authors, the flexible tool may be modified depending on ground reality. It has been used as an analytical tool in a multi-sectoral approach to problem identification [26]. The current study focuses on its use to identify agricultural extension needs in a perceived disadvantaged rural community.

2. METHODOLOGY

On the basis of the background to the Sustainable livelihood framework approach, a case study was conducted in a village of Nandi County in Kenya, after it was selected for study by a group of rural development stakeholders. The stakeholders forum (SF) was composed of staff drawn from different sections of government departments; Crop development extension (1), Soil and water conservation (1), Gender and Home Economics (1), Veterinary service providers (1), Social Services (1) and Cooperative Development (1) and a facilitator. The community was represented in the stakeholders' forum by 16 representatives drawn from different locations of Tinderet Sub-county. Through a participatory process the stakeholders developed criteria to identify a disadvantaged community in the Sub-county. Participatory approaches were used because it allows community members and development practitioners to own the local factors influencing poverty levels and is an effective tool in creating decentralized policies [9]. The methodology is also ideal for guiding community-driven development as it empowers local people to look systematically at the circumstances and experiences of their community. In doing so, these individuals develop an awareness of local economic and social constraints and opportunities. The knowledge generated through the process can be used to prioritize community needs and initiate action at the community and household levels regarding livelihood strategies and the management of resources [27]. This community-based study was designed to address context-based needs.

This study adopted a case study research design and employed a participatory Livelihood Analysis approach to gather in-depth data on agricultural extension needs. According to [19] case study is a method of intensively studying phenomena within its natural setting in one or a few sites where multiple tools of data collection can be used. The design has the advantage of capturing a rich array of contextual data [28]. The context-specific study used community-based focus groups [29] and observation checklists as the main tools for data collection. Although the findings of case studies are limited in generalizations the focus of this study is on the approach; its usefulness or lack of it. The focus is on the efficacy of the Participatory Livelihood Approach as a needs-assessment tool in agricultural Extension, rather than on the findings on the needs themselves. The needs identified, however, remain important for use by local development agents.

Through the community-based focus group discussion [20] involving agricultural extension agents and community representatives, the stakeholders' forum was taken through a participatory learning tool on identification of the pathways to prosperity using community-generated indicators. The first step in the process involved constitution of the stakeholders' forum with diverse disciplines and community

representation. Secondly, a stakeholders' participatory meeting was held to develop community-based criteria on prosperity or the stages-of-progress indicators [29]. Thirdly, the most disadvantaged community was mapped out based on the prosperity criteria developed. The stakeholders were asked to categorize villages on the basis of the indicators they had generated. Pair-wise ranking was done to break ties between villages that were initially ranked the same. Through the exercise a village was identified which the stakeholders' forum considered to be resource poor and marginalized.

The 'marginalized village' was targeted for study with the aim of carrying out Agricultural Extension needs assessment. The village was purposively chosen for the study after it was selected by the stakeholders based on its unique location that makes the area largely inaccessible to services and were perceived as disadvantaged resource-wise. In the fourth step that involved the entire community, the community generated their own indicators for measuring economic and social prosperity in their context during community-based focus group discussions convened in a selected venue within the village. The community-based focus groups validated the criteria developed earlier by the stakeholders' forum. The economic and social prosperity indicators were categorized based on three levels; the poor households, middle and the resource rich. The cluster of indicators generated through the process had clear cut-lines on the stage at which the resource-poor ceases to be referred to as poor in the local context. In the sixth stage of the process, the community-based focus group mapped out household livelihood strategies and their stages-of-progress based on the indicators developed. The indicators developed for household categorization largely revolved on ownership of assets such as the type and number of livestock, land ownership and size or leased land, ownership of off-farm business, type of housing, type of school attended by children, level of schooling, type of meals, mode of transport and investments in urban centres.

The case study was carried out in a village of Tinderet Sub County, in Nandi County, Kenya. All the households in the village were targeted for study. The household heads were invited to one of two meeting venues. Each of the meeting venues was attended by 14 household heads. Consequently a total of 28 households out of a target of 36 resident households participated in the exercise. During the community meetings, the agenda of the meeting was clearly explained to the participants, bringing out the need to generate information for purposes of collective understanding of agricultural Extension needs of the community. The forum agreed to meet for two consecutive days at each of the venues in order to compile the household data as accurately as possible. The first few hours was used to create a common understanding on the value of the information that would be generated through the process and to build positive social relationships and create rapport among the participants. The facilitators and the community members shared tea and lunch and in the process informal discussions proceeded quite well with a view of ensuring that household information from the village was accurately presented.

After creating good rapport with the community some members of the community volunteered to lead the process of documenting the data on a flipchart so that it could be documented further later. Every household presented their information as requested by the community facilitator in tables that were drawn up to aid in the process. The following section is a presentation of the findings using the participatory approach and the sustainable livelihood study framework.

3. RESULTS AND DISCUSSION

3.1 Livelihood Assets

3.1.1 Land and soils

Land was regarded as the most important asset in the village. The area received fairly well distributed annual rainfall. A permanent stream crossed the village, draining to a large river about 10 km away. The land sizes ranged from 0.08 of a hectare to 6.05 ha, however, the majority owned about 0.40 ha as illustrated in Fig. 2. The large land size of 6.05 ha could be regarded an outlier since from a total of 28 households only two households had land size greater than 2.0 ha. On the basis of the small land sizes as reported by the households, their enterprise selections were judiciously carried out in order to ensure that the most important enterprises for their livelihoods could be accommodated. Most households had maize/bean intercrops deliberately grown to ensure there is an adequate supply of maize and beans for household consumption. This has implications in food self sufficiency for the households.

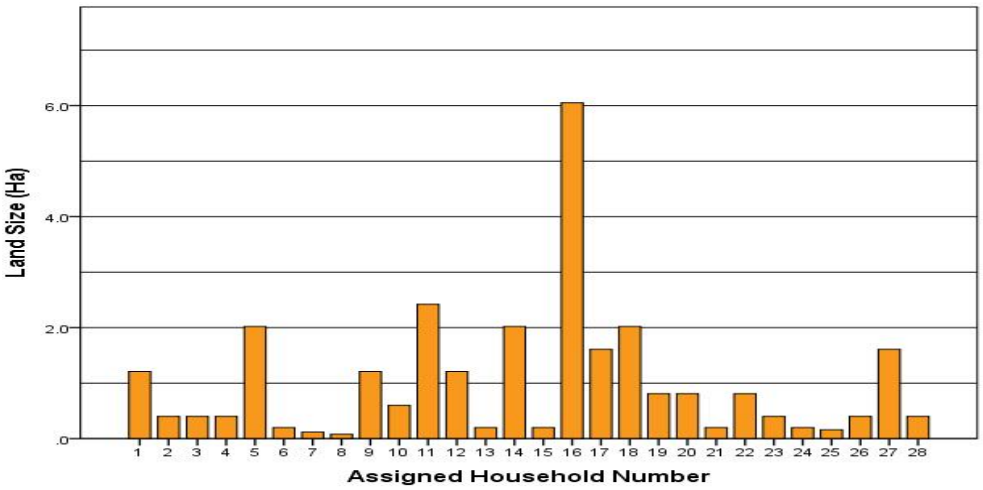

Fig. 2. Land asset size in ha
Source: Field Data 2019

In terms of topography, the village land is predominantly covered by steep slopes. Recent efforts by a Government Department of Public Works to open up a road to the village failed after it became quite difficult for the graders to negotiate through the rugged sloppy terrain; consequently the village has continued to remain cut-off due to the difficulty of opening up an access road through the rugged terrain.

The problem of soil erosion was quite evident in the area due to the steep slopes that cover almost all parts of the village. Soils have been eroded over years creating rich loamy soils in few valley bottoms and exposing lateritic soils of low fertility on the sloppy lands with average slope of not less 20%. Parts of the village had slopes as high as 40% by estimates [30]. Nutrient deficiencies were observed on coffee plants suggesting poor crop nutrition [31]. This may have been largely attributed to the susceptibility of the soils to continuous erosion during the rainy season as facilitated by the long steep slopes.

3.1.2 Physical assets

The study village in Tinderet Sub County is situated in a high altitude area with a rugged terrain characterized by the presence of many undulating slopes. The presence of steep slopes and rock outcrops is dominant in the village. An access road that was constructed towards the village stalled about 2 km away from the village. Reports received from the households indicated that the road construction stopped when it became increasingly difficult to open up a rugged rocky portion using grader machines. This road would have provided an important physical capital, particularly for the households that grow coffee which has to be transported to the pulping stations. It would equally have been important in opening up the village to facilitate access to nearby trading centers where they could participate in small businesses such as selling of local vegetables which they were already engaged in. Only one household in the study village had some investment in physical capital; this was a mill used for maize milling for human consumption. Authors [14] have referred to assets, including physical assets as “inverse proxies” for deprivation. The argument of the authors is that low capital can be equated to greater poverty.

3.1.3 Financial assets

The low levels of physical capital in the village may imply low levels of financial capital. However, a participatory discussion during the forum suggests some households in the village occasionally received some financial assistance from their children who worked outside the village; some as far out as in cities. The farmers who grew coffee harvested their crops once in a year, but they lamented that the pay was so low. A further probing to establish the real cause for the low pay reveals that the coffee cherries delivered to the pulping stations is of low quality. The low quality was attributed to poor nutrition [31] since all the households that grew coffee did not apply any top-dressing fertilizer during the year. The nutritional status of the crop is further diminished by the topography that accelerates

soil erosion during the rainy season; washing away top fertile soils [32]. The ultimate product delivered to the Farmers Cooperative Societies for pulping is of low quality and fetches low prices from the market. Small businesses as reported by some households was a contributor to financial assets in the village, however, the businesses were reported by only three households from the 28 households that participated in the study. Trading in local poultry eggs, live birds and trading in local vegetables and operating a maize mill were the few businesses reported by village residents.

The observations on the sources of financial assets suggest that maize/beans, coffee and small trade presents an opportunity for increasing financial assets. The household heads reportedly did not have access to banking services and formal credit facilities. Coffee earnings were reported to be low and the reasons for low earnings needed to be addressed; low quality coffee being delivered to the market and bringing in low cash earnings. This needs to be discussed over and over in the community and ways for injecting more inputs into the coffee subsector identified so that the enterprise can bring out more financial returns. This may be achieved through social networking to raise resources to invest in the productive livelihood strategies.

3.1.4 Human assets

The pursuit of different livelihood strategies by the households requires skills, knowledge, labour and good health. Household Heads reported sending children to school while others indicated their children had completed colleges. During the conversations, some household heads replied to the facilitator in unison that “their children had completed college education”. Although there was no indication that the children who had completed schooling reside in the same village, households reported receiving some financial support from their working children. They also probably contributed their ideas to their parents’ livelihood strategies.

An interaction with the community revealed that land preparation and crop establishment as well as weed control in the farms were the most demanding activities in terms of labour requirements. Duties in the households were allocated among the different gender. Land preparation for maize/ bean growing was said to be a demanding activity as it is carried out during the dry sunny months of January to February. Consequently the entire family was involved; men, young men and women. This activity was carried out before the onset of rains and because of the importance of the maize/beans strategy as a food supplier, during this particular period all the other activities were relegated in favour of land preparation for the maize/beans growing. Some households that owned oxen used oxen-drawn ploughs for land preparation. The use of tractors for land preparation was not feasible in the area because of the rugged sloppy terrain.

Labour for the cattle rearing activities were apportioned among family members. Adult men and young men had the responsibility of feeding the cattle outside the homestead or grazing them while milking of the cows was mostly the role of women. Cultivating to grow local vegetables and its husbandry practices were the responsibility of women and girls. These observations made on the allocation of duties based on gender have implications on extension targeting. For example, the growing of local vegetables which is predominantly a female activity presents an opportunity to target women groups and youth females for capacity building in local vegetable production and utilization. Dairy cattle feeding technology would be more effective by targeting the whole family since all gender appeared to have a role in cattle husbandry; one group involved in pasturing and another involved in the milking and feeding within the homestead.

In coffee production the main activities captured from the discussants were on weed control, cherry picking and transportation to the factory. The main actors in the weeding of coffee fields and the picking of cherries during harvesting period were women and girls as reported by the community (Table 1). Transportation of the cherries to the pulping factories was carried out mostly by youth; both boys and girls. There were two pulping factories within the reach of the village; both operated by Farmers Cooperative Societies. Delivery of coffee cherry to the societies for pulping presented a challenge as most farms were found on hilly terrain; this suggests high drudgery as the cherries were transported on human backs. Donkey transport which had been tried by few households in the past was phased out as the donkeys required large pieces of land on which to graze and yet land sizes were increasingly getting smaller. In the words of one farmer, he emphasized that there was “no land on which to tether the donkeys for grazing”. From the total of 28 households whose information was captured,

only one owned some means of transport; a motorcycle, but the motorcycle was used in the nearby centres for taxi business and was not meant for transporting farm produce. These meant that household members had to provide all the farm-produce-transport labour required for the movement of crop produce particularly coffee to the pulping stations.

The cattle-rearing and crop growing practices in the village suggests some level of enterprise diversification. The presence of a variety of livelihood strategies suggests the use of experiential knowledge. A question was posed by the facilitator to inquire where they obtained their skills in farming; a general consensus from the group was that they had been doing it over the years. This indicated that much of the knowledge they used in undertaking their activities was experiential. Only three households indicated that they got their skills on coffee management from an extension agent. The observations suggest an opportunity for increasing the human resource capital through agricultural and rural extension. The poor access to the village and the distance to the nearest agricultural extension agent were cited as impediments to Extension-Farmer interaction. The community-based meeting, however, served as an awareness forum to inspire the community to be information seekers and users to enhance the productivity of their resources.

3.1.5 Social assets

Serrat [33] suggests that social capital is the ability of a group to carry out activities together and to collaborate with others; having shared values and behaviours. Clark and Carney [34] explain that social resources include informal networks, formal groups and any relationship of trust that facilitates cooperation among the members. The household members of the study village reported being members of one of two Farmers cooperative societies within the locality. These societies made them to work together in the coffee sub-sector. A self-help group for youth involved in horticulture is said to have gone dormant. The households represented during the discussion could not explain the exact reasons for the dormancy of the youth group. This observation suggests a need for Extension/youth-farmer interaction to build the capacities of the youth on leadership and group dynamics. The involvement of a few households in the village in activities that were viewed as out of tune with the values of the community as reported by the discussants was said to be a source of conflict in the village. This is a negative factor that diminishes the value of social capital in the community. The indication that there were cases of disharmony in the community is consistent with arguments that have been advanced by [14] that offences can cause trust to decline and impact negatively on social capital. This appeared to have been the case in the study village where the village dwellers cited tensions between households due to some households engaging in activities that were out of tune with their general values.

In view of the openness of the participants in disclosing their internal conflicts, there appears to be a good-will among a majority of the households to end the negative vices. This presents an opportunity for the local administration to address the village issues. Community involvement in addressing the issues is likely to yield better results rather than a top-down approach. Scoones [27] emphasizes on social relations as an important form of social capital among rural households, however, in the absence of trust among the members social relations and affiliations cannot thrive. Serrat [33] asserts that social capital is about shared values and behaviors, suggesting that a deviation from the shared values as observed in the current study compromises on the social capital value in the community.

3.2 Vulnerability Context

Disasters facing households as captured from the community-based focus group discussion include; terminal diseases, death of spouse, and severe climatic conditions such as harsh droughts. One family head reported being pushed into poverty following a terminal disease which forced him to sell land. The sale of land appeared to be an extreme case of a coping strategy. The common coping strategies against vulnerability in the community included; providing casual labour in neighboring large scale tea farms, engaging in small businesses like moving through households to look for poultry, poultry eggs and local vegetables to be marketed at the nearby trading centres. Some individuals cite the sale of firewood sourced from the forests as a quick source of cash to meet pressing needs. Authors [13] similarly reported a dynamic change in rural livelihood practices due to vulnerability of poor households to climatic shocks in Bangladesh. The latter has implications on sustainability from an ecologic view point. The community, however, has diverse livelihood

strategies through the use of their resources as illustrated in Fig. 3.

3.3 Livelihood Strategies

3.3.1 Livelihood strategies and diversification

The purpose of livelihood strategies is to enable households to meet their self-defined beneficial livelihood outcomes as explained by [35]. The livelihood strategies in any given location are impacted by policies, institutions and processes which influence access to resources in order to achieve their livelihood goals [36]. The village studied boasts of access to two Farmers Cooperative Societies, an important institution in facilitating the processing of their coffee produce. However, the Farmers Cooperative Societies (FCS), according to the residents was reportedly under-performing; they lack water for continuous coffee pulping and was occasionally forced to stop pulping. Maize/bean crops benefited from fertilizer bought from National cereals and produce board at subsidized rates from a depot about 10 km from the village.

Apart from the maize/beans and coffee growing, the other livelihood strategies undertaken by households in the village included; Cattle rearing, poultry keeping and vegetable growing (Table 1). Diversification of enterprises appeared to be a common strategy for households as indicated by the diversity of their enterprises. Diversity was cited as an important strategy as explained by one elderly household head. The participant explained that diversification ensured that “when one activity fails, there is at least another one which will succeed”. This explanation suggests deliberate actions to guard against risks. A further discussion on the subject of risks revealed that the most common type of risk to the community was drought and risks of pest and disease outbreaks.

The community was said to be more vulnerable during years of extended drought. During such periods food scarcity is rampant and in order to cope some households sell their livestock, while a large number of youth and women move to the nearby tea estates to provide casual labour. During the period some village dwellers engaged in rather destructive activities; with many women reportedly sourcing firewood illegally from forests and neighboring large farms. The firewood is then sold near a trading centre and the proceeds used to purchase food. Similar findings were reported by [13] who observed that some communities in Bangladesh intensified their natural-resource based activities to cope with weather-related vulnerabilities. In the current study, as the members of the village revealed these coping strategies they appeared embarrassed and remorseful that they sometimes had to engage in dishonest activities to ensure there is food in their households. These feelings of indignity associated with times of scarcity presents an opportunity for the promotion of agro-forestry. In view of the desire by the community members to lead a dignified life as observed in the village, agro-forestry to supply fuel-wood may be a welcome strategy to ensure availability of fuel wood for domestic use and for sale in situations of food deprivation.

Table 1. Household livelihood strategies as reported by the participants

Strategy	No. of households currently using	No. of households that used 10 years ago
Maize/beans	23	22
Coffee	12	8
Cattle for milk	12	10
Poultry	9	13
Small business	3	0
Local vegetables	3	0
Tomatoes	1	0
Bananas	2	0
Trees	2	0
Goat rearing	1	0
Carpentry work	1	0
Motorcycle (*boda boda*)	1	0
Tea	1	0
Irish potatoes	1	0
Plucking tea	0	1
Sugarcane	0	1
Sweet potatoes	0	1

Source: Field Data 2019

Authors [14] suggests that most people just want to survive first then prosperity comes second, whereas the more fortunate are concerned with maintaining their lifestyle, finding somewhere to live and educating their children. This argument is quite in agreement with the statements brought forth by the households that their priorities were food and they expressed satisfaction that they had educated their children. Authors [14] have emphasized that livelihoods is about people and what they perceive to affect them directly; consequently aspects of environmental concerns can be traded off in favor of economic and social gains. This may be the case judging from what the community has done in cultivating

land that is regarded as too steep for any form of cultivation to be undertaken. Whereas they are knowledgeable about the eventual consequences of gradual loss of soil fertility, their immediate concern is the food for today. In the context of what the households do, it appears the environmental concerns do not matter to their day-to-day existence as referred to by [14] in reference to societies whose immediate goal is survival and concerns for prosperity only comes quite later.

The observations made in the village present an opportunity for addressing environmental concerns as there is evidence from the crop performance that indeed environmental degradation is affecting their lives today. The management of natural capital such as land, water and biodiversity is never a priority of people who are living in poverty; their immediate priority is short term survival [37]. The considerations to be made in the outcomes from the livelihood strategies includes raising the level of capabilities, assets and activities for maintaining livelihood in such a way that it can recover from stresses and shocks, add capabilities and assets without undermining the natural resource base [18]. The natural resource base on which most of the activities were undertaken in the village is the land and soils on which diverse crops and livestock are raised. Land was the most important resource, however, there were other resources used including human resources.

The natural resource base is a critical factor since all the households engaged in agricultural production. The sustainability of the land resources including soils and water is a key aspect to sustained livelihoods. The presence of gullies, yellowing coffee crop with evidence of nutrient deficiencies [31] suggests that there is an opportunity for soil and water conservation efforts. It has been argued before that environment with the kind of physiographic conditions as observed in this locality requires that the farming community be adequately equipped with knowledge in soil conservation technologies [38]. The ability of the land to maintain productivity under the current levels of care without external knowledge, skills and action is not feasible.

3.3.2 Livelihood strategies, constraints and division of labour

Among the strategies reported by households, a total of 23 households kept cattle, 13 households raised poultry and one was engaged in goat rearing (Table 1). These livelihood strategies present an opportunity for soil fertility maintenance through manure application from the livestock to the crop fields as the community has already recognized the challenge associated with topography as indicated in Table 2. However, the community will need to first appreciate that land degradation will not only affect them in future, but that it does affect them today. Efforts to rehabilitate the soils will require labour inputs and some financial inputs. Author [25] similarly reported pest & disease pressure and soil infertility challenges in a study conducted using the livelihood framework in the Ethiopian highlands.

3.3.3 Trends in livelihood strategies

There was an increase in the number of households engaged in maize/bean production as an important source of food for the households as illustrated in Fig. 3. A large proportion of the maize/beans grown was for home consumption; hence a food security activity; only a small amount would be sold out to meet urgent obligations/commitments. Coffee production during the last 10 years was carried out by few households compared to now; an indication that there has been growth in the number of households engaged in the strategy. The community attributed this trend to improved coffee infrastructure, particularly the presence of two pulping machines within the reach of the village. There has also been an increased need for cash earnings through farming.

An interesting observation is made with regard to the trend in poultry production where more households engaged in poultry production 10 years ago compared to now. The community explained that high incidences of poultry diseases' resulted in some households withdrawing from poultry keeping. This observation presents an opportunity for capacity building through training and Extension on pest and disease control in poultry production, particularly on the management of coccidiosis and Newcastle diseases [39] which had affected indigenous chicken rearing in the village. The community reared cattle; mainly crosses between exotic breeds and Zebus. The livelihood strategy was important 10 years ago and important now and the trend also suggests a growth in the number of households engaged in cattle rearing (Fig. 3).

Table 2. Major livelihood strategies, actors and constraints as cited by participants

	Strategy	Actors	Constraints
1	Maize, Beans	Men, Women, Young Men Land Preparation with ox-plough by men only	Topography(sloppy) Pests; mostly aphids and Bean fly Low prices of maize
2	Coffee	Marketing-Male Transportation –Youth, Women, Young men, Young women	Diseases and pests such as coffee berry disease and coffee leaf rust Coffee Management Poor Infrastructure Lack of skills
3	Dairy	Men, Young Men, Young women, Women	Poor Infrastructure Low fertility Long calving period Inadequate watering facilities Poor tick control Inadequate feeds
3	Poultry	Women, Young men	High incidence of disease High cost of feeds
4	Local Vegetables, Bananas	Women Young women	Long drought season Poor road network Expensive seeds

Source: Field Data 2019

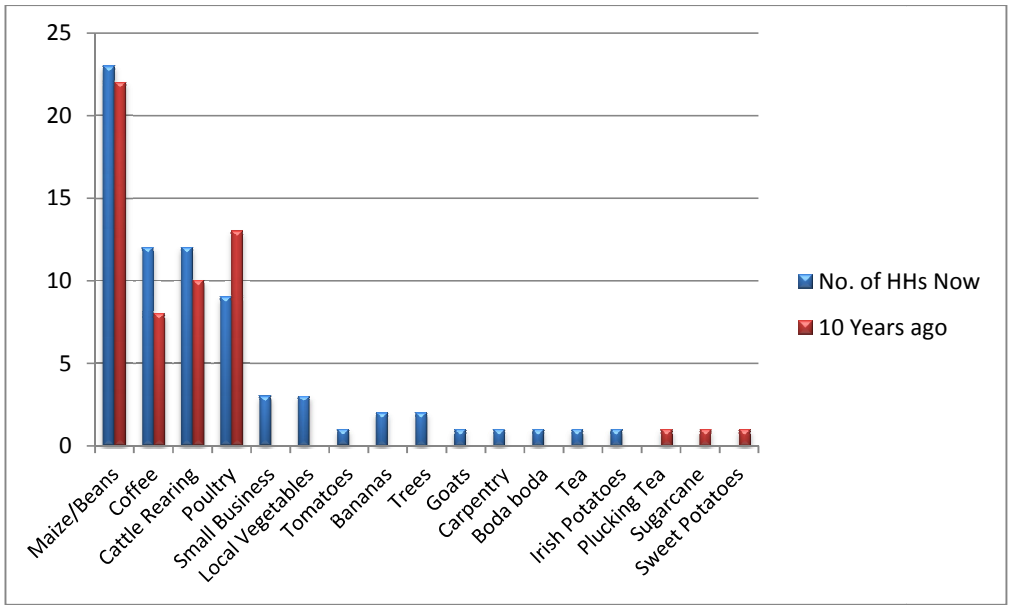

Fig. 3. Livelihood strategies as reported by households and their number
Source: Field Data 2019

3.4 Livelihood Outcomes

Maize/Beans were grown across the village by almost all households as an important food security strategy that has enabled the community to remain self sufficient in food needs. Engaging in small businesses has enabled them to increase their incomes. However, 4 out of the 28 households were reportedly vulnerable based on the participatory analysis in which the community generated indicators for stages of prosperity; beginning from the most vulnerable to the most prosperous in their own context. According to the community some negative vices such as alcohol abuse existed in the village as reported by the household heads. The vice is said to adversely affect farm labour, use of farm income, family stability, school attendance and community peace as elaborated by the community. The community reported that they mitigated against

the effect of the alcohol abuse by collaborating with the local administrators in order to eliminate the vice.

Positive or sustainable livelihood outcomes are expected in households that are able to meet their basic needs and increase their assets continually without having to resort to the natural environment to meet their needs. In the study area, the report gathered suggests that men and women sometimes had to engage in activities against the community values in order to cope with stresses and shocks in their livelihoods. The observations suggest non-resilience of the livelihoods and present an opportunity for interventions by Rural Development agents.

3.5 Reflections and Summary

From the study of the village in Nandi County, Kenya, using the Participatory Livelihood Analysis approach, the following reflections and summaries are made:

i) Land was the most important productive resource, however, the land suffered from severe degradation occasioned by soil erosion. The severe soil erosion was attributed to physiographic factors and human activities.
ii) There exists a low level of investment in physical capital, suggesting a need for the raising of physical capital particularly in form of physical infrastructure such as access roads to support agricultural production.
iii) Diversification of livelihood strategies in the community is an 'immanent' development that needs to be supported through capacity-building interventions; in a case of helping the village to help themselves raise physical, financial and social capital.
iv) Weak social networks call for interventions in order to boost the social capital. An opportunity exists for the societies that are dealing in coffee pulping. Strengthened Farmers Cooperative Societies can be used to train the small-scale farmers on production of improved quality coffee.
v) Involvement of the community in addressing issues affecting them through collaborative efforts with the local administration and Rural Development agents is likely to yield better results than a top-down approach. Agricultural Extension service providers in particular will be compelled to look at multiple entry points for their interventions as suggested by [33].
vi) Four broad categories of needs were identified during the process. First category was technical-knowledge needs on agronomic practices in coffee production, agro-forestry and poultry pests and disease management. Second category pertained skills on soil and water management and the third was on infrastructure development to facilitate movement of farm produce. The fourth category of needs was on credit facilities to facilitate ongoing projects such as the improvement of the coffee processing facilities that were already serving the community.

4. CONCLUSION

The study unearths the presence of under-utilized resources in the community, inadequacy in the levels of investments in physical resources, social capital, livelihood strategies and their constraints and opportunities. The approach used created a close working relationship between the community and the outsiders; the researcher and development agents. The participatory livelihood analysis provided an in-depth understanding of the community' agricultural-extension-needs for a community perceived as disadvantaged. The study was conducted in one disadvantaged village; it is recommended that the approach be further tried in similar socio-economic contexts in the tropics for the identification of agricultural-extension-needs of disadvantaged communities. In particular, further trials are recommended to understand the underlying challenges and opportunities in the livelihood strategies of inaccessible communities to inform agricultural extension interventions.

CONSENT

Individual consent was sought from the participants prior to data collection

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COMPETING INTERESTS

Author has declared that no competing interests exist.

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