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Community Farmer Field School Animal Health Facilitators:

Hybridizing private animal healthcare and capacity building in remote pastoralist areas

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Community farmer field school animal health facilitators: Hybridizing private animal healthcare and capacity building in remote pastoralist areas

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Executive summary

The report has four specific objectives. 1) To evaluate the inherent capacity of the Livestock Farmer Field Schools (LFFS) approach to contribute to the development goals of VSF-Belgium in Turkana, Kenya; 2) To evaluate current strengths and weaknesses of the community-based primary animal healthcare system in Turkana; 3) To evaluate the appropriateness, and the likely success, of combining the role of Community Animal Health Worker (CAHW) and LFFS facilitator; 4) To assess the initial performance of Community Farmer Field School Animal Health Facilitators in 10 pilot LFFS sites and evaluate opportunities for scaling-up of the LFFS model.

The report is broken down into nine sections. Section 1 provides an overview of traditional pastoralism in Turkana. Section 2 examines the acute livelihood challenges faced by pastoralists. Section 3 summarizes the history of key livelihood interventions in Turkana. Section 4 is divided into two subsections: (a) evaluates the role of International Non-Governmental Organizations (INGOs) in catalysing the re-establishment of a primary animal healthcare system in Turkana and in promoting Community Animal Health Workers (CAHWs) as the cornerstone of this system, and (b) provides an overview of the Farmer Field Schools (FFS) approach. Section 5 explores the possibility of combining the CAHWs and FFS approach in the form of Community Farmer Field School Animal Health Facilitators. Section 6 provides an initial assessment of the CAHWs/LFFS Facilitator approach in Turkana. Section 7 provides a conclusion to the report, and Sections 8 and 9 suggest recommendations on the way forward and future research needs, respectively.

Nomadic pastoralism is central to the economy of Turkana, which is the largest, yet least developed, district in Kenya. However, since the late 1980s and early 1990s, severe drought, acute food insecurity, conflict and the declining provision of livestock services by the Kenyan Government have prompted many livestock-based international non-governmental organizations (INGOs) to begin training and financing CAHWs as a means to support the increasingly fragile existences of nomadic pastoralists in Turkana. CAHWs are livestock keepers or herders who live in the communities they work with, moving with the herds during seasonal migrations often to inaccessible and insecure areas. CAHWs diagnose and treat livestock diseases; sell western and ethno veterinary drugs; advise livestock owners on the marketing of livestock and livestock products, and promote animal welfare and good livestock management practices. CAHWs are often used in a public good capacity by District Veterinary Officers (DVOs) and INGOs to: mobilize communities; assist in vaccination campaigns; report on key diseases; provide useful links between livestock keepers/herders and district veterinary authorities and facilitating agents; provide information on disease control and prevention, public health issues including meat and milk hygiene to avoid

zoonotic diseases and; to sensitize communities on policy and legislative issues relating to the livestock sector. CAHWs are seen by many to be key components of efficient, cost-effective systems of privatized veterinary services in remote and/or insecure areas. CAHWs have also been recognized as a key component of capacity building, particularly with respect to enhancing human and social capital with respect to improving livelihood coping strategies and promoting more sustainable forms of rural development. However, others question the capacity of CAHWs to provide quality primary animal healthcare. Many commentators consistently stress the problems faced by CAHWs in delivering services (quality and otherwise) to remote and/or insecure areas, particularly when compounded by extreme environmental challenges, namely, drought. However, possibly the greatest weakness of the CAHWs' approach is the lack of financial robustness.

The FFS approach, which is the second focus of the report, represents a paradigm shift in agricultural extension and can be viewed as a capacity-building investment in the sector of education, information, and training. Essentially, the FFS model provides an opportunity for a group of individuals that share similar livelihood challenges and to engage in a process of learning-by-doing, based on principles of non-formal education. This approach reflects the four elements of the 'experiential learning cycle': 1) concrete experience, 2) observation and reflection, 3) generalization and abstract conceptualization, and 4) active experimentation. The aim of an FFS is to build farmers' capacity to analyse their production systems, identify problems, test possible solutions and eventually adapt the practices most suitable to their farming system. Key strengths of the FFS approach can be broadly categorized as: the enhancement of human and social capital and a key entry point for new practices and technologies. A number of key weaknesses of the FFS approach have also been identified, namely problems associated with: applying the standard FFS format; addressing the complex needs of mobile communities; technologies only partially meeting participant's needs, particularly where local challenges are extremely complex or multi-dimensional and/or where there is little or no control over key factors; experimentation dominated by the local elite, marginalization of the extreme illiterate poor; lack of effective networking, and; the relative high unit costs of FFS compared to other methods of adult education and capacity building. In addition, there is little evidence of diffusion of knowledge and practices from FFS graduates to other farmers beyond the local level. Indeed, FFSs are accused of having limited or zero impacts on the overall economic performance of national agriculture sectors, environmental sustainability, and rural health.

In Turkana District, CAHWs were trained and deployed as facilitators in 10 pilot LFFSs. Key topics covered included disease identification and treatment; enlightenment to their environment (particularly observations of animal health and condition, and livestock feed and water); fodder production; and new feeding techniques. Evidence from LFFS focus

discussion groups (FGDs) supported the key role of CAHWs as teachers and development catalysts and that LFFSs are perceived as a good mechanism by which to hybridize new knowledge and skills originating from outside the community and existing knowledge in the community supplied by LFFS students. The CAHWs facilitated LFFS learning process was perceived as offering opportunities mostly for illiterate and poorly educated pastoralists to enhance their human capital. LFFS students expected their knowledge to improve on key topics of importance to them, such as animal production and nutrition and disease treatment and that the new knowledge would assist them in improving their livelihoods. However, concerns were raised regarding the lack of knowledge possessed by the CAHWs facilitators. Several local actors remain unconvinced of the capacity of CAHWs to successfully execute the role of LFFS facilitator specifically on the grounds of illiteracy and lack of training and knowledge.

Whilst recognizably still in its infancy, the LFFS approach seems to offer significant potential to contribute towards VSF-Belgium's stated goal of 'improving the living conditions of vulnerable people in developing countries who depend directly or indirectly on livestock by improving livestock keeping'. On the whole, CAHWs are well respected, trusted and credible, and highly valued members of their communities. CAHWs are accredited with the ability to provide a wide range of crucial livestock-based services and are well recognized by pastoralist communities for their knowledge, experience, teaching skills and leadership. Whilst acutely aware of their low levels of human capital, pastoralists seem happy with the performance of their CAHW/LFFS facilitators. Whilst the lack of formal schooling is acknowledged as a problem, CAHW facilitators are generally recognized as being knowledgeable on the topics of greatest concern to pastoralists. However, many key development actors in Turkana still remain concerned over the ability/capacity of CAHWs to successfully fulfil the role of LFFS facilitator. Ultimately, however, as with the animal health situation, perhaps CAHWs are the only feasible option for LFFS facilitation in Turkana.

To date, the majority of LFFSs seem to be progressing well; with anecdotal evidence of significant human capacity building. However, the agro-pastoralist focus of all 10 LFFSs is likely to have the most significant bearing on the likely success of VSF-Belgium's plan to scale up the initial 10 pilot sites to 50 LFFS sites. All LFFS pilot sites are currently focusing on agro-pastoralist and/or livelihood diversification activities which rely on either permanent or seasonally reliable access to water and good links to output markets. Whilst the current sites close to Lake Turkana and along the Turkwell and Kerio Rivers have good access to water resources and market outlets, the success of future LFFSs, if established in more remote areas with poor access to water and markets, cannot be so easily secured. Furthermore, the establishment of LFFS in more remote areas may also be hampered by even lower levels of human and social capital possessed by CAHWs in these areas. It is therefore uncertain as

to whether or not the relatively successful experiences of CAHWs facilitated LFFSs can be directly transferred to new LFFSs in more remote/insecure areas with limited access to water and output markets.

Recommendations

- Examine options for the payment of salaries to CAHWs and LFFS facilitators for their public-goods services.
- A review should be made of the amount of profit made by CAHWs on livestock drugs.
- All efforts should be made to promote multiple incomes sources for CAHWs.
- Business training should be provided for CAHW facilitators.
- Explore the possibility of assisting CAHWs with a means of transportation.
- Livestock marketing should continue to be promoted in the area.
- Financially viable livelihood diversification activities should continue to be supported in the area.
- Marketing interventions should be undertaken to create stable profitable outlets for the outputs of diversification.
- Assistance should be given to LFFS groups to source additional finance.
- Assistance should be provided to LFFS groups to build human and social capital.

Future research needs

- A detailed base-line survey is conducted for the 10 pilot LFFS sites.
- Monitoring and evaluation of LFFS pilot sites and of newly established LFFSs should take place in 2009.

1 Traditional pastoralism in Turkana

Designated as one of Kenya's Arid and Semi-Arid Lands (ASALs), Turkana District is located in Northwestern part of Kenya bordering Ethiopia to the North, Sudan to the Northwest and Uganda to the West. Turkana District covers an area of approximately 77 thousand km^2 (Ajele 2005) and has an estimated population of 497,779 (ITDG 2005a). Turkana is the largest, yet least developed, district in Kenya. Rainfall in the district is bimodal (long and short rains). Average precipitation ranges from 121 mm in the east to over 540 mm in the Northwest. While droughts are a regular feature in Kenya's ASALs, it is widely believed that droughts are occurring more frequently and are becoming more severe. For example, the 1999 to 2001 drought in Turkana was more severe than the previous droughts of 1992–93 and 1996–97 (Aklilu and Wekesa 2002). As a direct result of low and erratic precipitation, high temperatures, localized occurrences of highly saline soils and soils of low mineral content, there is relatively little vegetation cover and the district is predisposed to soil erosion. Less than 3% of the district has agricultural potential, which is generally restricted to the hinterlands of permanent rivers (Ajele 2005). Most of the land, however, is suitable for grazing and browsing. As a result, nomadic pastoralism, organized on the subsistence-based exploitation of shifting grazing and browsing opportunities, is central to the Turkana District's economy. According to Blench (2000), approximately 70% of the human population inhabiting Turkana are nomadic or semi-nomadic. At least 64% of the population are dependent on pastoralism for their livelihoods, with a further 16% dependent on agro-pastoralism. The remaining population in Turkana District relies on fishing around Lake Turkana (12%), which is also a drought mitigation strategy for nomadic pastoralists during severe droughts, and 8% who rely on income from numerous small businesses in Turkana's urban areas.

The nomadic pastoralist economy of Turkana District, which has one of the highest numbers of livestock in the country, is based, in order of numerical importance, on goats, sheep, cattle and camels (ITDG 2005b). In addition to providing life-sustaining products (such as milk, blood, meat, hides, skins and ghee), goats, sheep, cattle and camels constitute an integral part of the communities' social and spiritual life used as payment of bride price and in local rituals (Hogg 2003). The majority of wealth in Turkana is held in the form of livestock (Barrett 2001) and virtually all cash earnings come from either sales of livestock or livestock products (Little 1992; Coppock 1994; Manor 1995; Desta 1999; McPeak and Barrett 2001; Barrett and Luseno 2004).

As droughts, or periods of unusually low rainfall, are part of the expected pattern of precipitation in Turkana, the traditional strategy of pastoralists is to move to areas with higher rainfall, where both grazing and browse can usually be found in the dry season, and then

return to traditionally drier areas (the plains) when the rains arrive and both pasture and browse are renewed. The survival of their herds depends on the pastoralists' willingness and capacity to move (Gallais 1977). In Turkana, systems of natural resource management primarily evolved around common tenancy of land organized for the efficient utilization of available resources, primarily for livestock herding (USAID 2002). However, as boundaries between different clans have never been static or rigid, survival is dependent on a web of good relationships between clans. Migration is always negotiated between groups (USAID 2002) and often extends to South Sudan, Ethiopia and Eastern Uganda (ITDG 2005a). When planning livestock migration, pastoralists have to balance their knowledge of pasture, rainfall, disease, political insecurity and national boundaries with access to markets and infrastructure. They prefer established migration routes and often develop long-standing exchange arrangements with farmers to make use of crop residues or to bring trade goods (Blench 2000).

Other drought mitigation strategies include: the division of large herds into smaller units (species and production specific); the keeping of multiple species; stock loaning between relatives and friends; additions to the diet, such as wild fruits and bartered cereals; and begging for food (Watson and van Binsbergen 2008a). In a survey conducted by Watson (2006), 52.5% of respondents in Turkana District traditionally migrated to water and pasture, 25% slaughtered livestock and preserved meat, 17.5% collected wild fruits and gums, and 15% initiated small businesses as a means of drought mitigation.

1.1 Livestock-based livelihoods

The traditional pastoralist way of life is based on socio-cultural norms and practices and not the rationality of market-based capitalism. Strong cultural ties bind pastoralists to their extended families and their livestock. Whilst markets for livestock, based on elaborate networks of traders and middlemen, have long been a feature of African pastoral systems, including those of northern Kenya (Kerven 1992), exchange of livestock for goods has traditionally been undertaken on a barter basis. Indeed, Watson and van Binsbergen (2008a) stated that, in many areas surveyed, pastoralists had only been exposed to the cash economy for the last 10 years or so. Whilst the bartering of livestock for maize and other staple grains, blankets and other key goods and services still exist in the contemporary period, the cash economy is slowly emerging. Livestock, particularly goats, are sold so that the vendor may pay school and hospital fees etc. However, while the growing presence of the market is acknowledged, there is substantial disagreement between researchers and development practitioners as to the extent to which market relations have penetrated the pastoralist livestock economy in Turkana and other districts in Northern Kenya. For example, Barrett et al. (2003) suggest that the literature on East Africa reveals consistently low marketed off-take

rates, 1.5 and 3.5% of beginning period cattle stocks among Boran pastoralists since 1980, with off-take rates less than mortality rates every single year (Desta 1999). Similar off-take rates have been observed in the Chamus and Gabra (Little 1992; McPeak and Barrett 2001). Off-take rates vary significantly between districts. For example, Mwangi (2005) suggest off-take rates as low as 5.7% in Turkana, compared to 14.6% in neighbouring Marsabit.

Of the livestock offered for sale in Turkana, goats and sheep are the most important species mostly being consumed within the district (Mwangi 2005). There is also a noticeable gender imbalance in the livestock offered for sale. As reported by Coppock (1994) and Desta (1999), female animals constitute less than 33% of the livestock sold; this is corroborated by McPeak and Barrett (2001) who suggest that females comprise only 20–30% of animals sold in any species or market. Accordingly, this reflects pastoralists' preference to retain females of breeding and milking age and to sell males when there is a need (Coppock 1994; Desta 1999). Another important point to note is that the lack of market orientation of pastoralists in Turkana often leads to exploitative terms of trade (whether bartering or exchanging for cash) when they do sell their livestock (Mwangi 2005).

2 Livelihood challenges in Turkana

2.1 Threats to subsistence-based pastoralism

Whilst pastoralism, as the principal livelihood, has existed in Turkana for 9000 years (Blench 2000), a series of rapid and external developments in the 20th and 21st centuries have tended to severely compromise long-distance opportunistic movements of livestock (Blench 2000). During the past 20 years or more, the survival of nomadic pastoralism as a traditional subsistence-based livelihood strategy has been increasingly threatened by: reduced access to traditional rangelands; persistent droughts and low rainfall; human and livestock diseases; increased human population; and general insecurity (Watson 2006). Although still practised, migration to traditional rangelands has been restricted by the establishment of national frontiers; the relatively uncontested migration between what are now Uganda, Sudan and Ethiopia no longer exists. The establishment of national frontiers has been further compounded by a spate of severe droughts throughout the past 40 years. These droughts have placed significant pressure on the livelihoods of nomadic pastoralists in Turkana causing catastrophic losses of livestock (capital and savings). In a recent study undertaken by the Watson (2006), 100% of pastoralists surveyed in Turkana indicated that drought was the principal livelihoods challenge. Watson and van Binsbergen (2008a) also identified drought as the principal constraint to livestock-based livelihoods in Turkana. According to Watson (2006), lack of permanent water was also a key concern of 65% of Turkana pastoralists. Furthermore, the impact of drought is particularly acute for poorer members of communities with smaller livestock holdings and less developed social support networks. Persistent droughts and low rainfall have undermined the pastoralists' traditional drought mitigation strategies of migrating in search of water and pasture, and the preservation of grazing areas for times of extreme drought (Watson and van Binsbergen 2008a). The consequence is that droughts, combined with restricted migration options, now cause significant humanitarian problems and localized degradation of natural resources, since large numbers of animals converge on certain pastures, especially around wells. This, in turn, is responsible for long-term impoverishment among pastoralists and high drop rates from the pastoralist system, since they lose livestock, or must sell them cheaply, and cannot afford to re-buy them when the drought ends. At the same time, it places extra stress on already ineffectual veterinary services, since weakened animals are more susceptible to pathogens (Blench 2000). In a study carried out in nine ASAL districts of Kenya, after drought diseases (both human and livestock) were identified as the second most important threat to livelihoods (Watson 2006).

Spatial marginalization of pastoralists is another major present day concern. Pastoralists are continually being pushed further and further into increasingly inhospitable terrain, with

greater risks of climatic uncertainty, as technical advances allow agriculture and agro-pastoralism to spread into new areas traditionally utilized by nomadic pastoralists (Blench 2000).

Increasing human population, in relation to livestock populations, also add to the risky nature of nomadic pastoralism in Turkana by increasing pressure on progressively scarce and fragile natural resources (Berger 2003). This was exacerbated in the 1980s by the introduction of trypanotolerant breeds, trypanocides, enhanced veterinary care and the elimination of tsetse habitat (Blench 1995). Because pastoralism is geared to the reproduction of the herd, there is an inevitable surplus of animals (most males and those females whose reproductive span is over), which can be disposed of without affecting the reproductive capacity of the herd (Hogg 2003). One of the assumed consequences of this is that, without intervening factors, livestock populations will eventually exceed the capacity of the range to support them (Hogg 2003).

Ultimately, political constraints to livestock migration, an increased lack of pasture and water due to severe droughts and encroachment onto traditional dry season pasture by agro-pastoralists, and growing human and livestock populations has led to increased competition and less co-operation between tribal clans within Turkana, and, between neighbouring tribes, in Picot (Kenya), Uganda, Sudan and Ethiopia. When livelihood strategies fail, conflict and livestock raiding becomes common place and violence extends from rural to urban areas (Berger 2003). Watson and van Binsbergen (2008a) identified insecurity as the third most important constraint to pastoralists' livelihoods after drought and livestock diseases; this was particularly important around the Loki char area in southern Turkana. According to Watson (2006), 96% of pastoralists sampled in Marsabit, Turkana and Moyale suggested that raids and general insecurity was a key livelihoods challenge.

2.2 Threats to market-oriented pastoralism

In addition to the key threats outlined above, the most significant threat to market-oriented pastoralism has been the rapid decline of government livestock production and marketing services, previously offered by the Livestock Marketing Division, and the subsequent closure of Kenya Meat Commission (major buyer of livestock from Turkana), which has only recently been re-opened. The re-establishment of profitable large-scale marketing of livestock from Turkana is also stifled by the inability of livestock producers in Kenya's ASALs to comply with the WTO's Sanitary and Phytosanitary regulations. In tandem with the loss of production, protection, and marketing assistance, once busy sale grounds, stock routes, and water facilities now lay unmaintained or abandoned (Watson and van Binsbergen 2008a). Interestingly, for those keen to sell livestock, 80% of pastoralist respondents in

Turkana mentioned a lack of livestock markets and poor prices as a key livelihoods challenge (Watson 2006). Furthermore, profitable livestock marketing in Turkana is increasingly stifled by: 1) under-investment in transport infrastructure (namely road); 2) insufficient measures to reduce insecurity; 3) lack of institutional capacity (producer and trader associations); 4) structural inefficiencies and high transaction costs (transport, insecurity, high fees, taxes and corruption); 5) trader cartels; 6) market brokers; 7) lack of market information; 8) lack of cash, cash savings and access to credit; 9) low and variable producer prices; 10) lack of political capital; livestock quarantine restrictions, and; 11) cultural impediments such as the need to seek permission to sell livestock from community leaders (Watson and van Binsbergen 2008a).

2.3 Limited livelihood diversification opportunities

During recent years, the impact of drought, increasing insecurity, and famine has led to a growing emergence of sedentary Turkana and experimentation with alternative livelihoods. Pastoralists in Turkana, and indeed in East Africa in general, increasingly pursue non-pastoral income strategies to meet consumption needs and to buttress against shocks caused by climatic fluctuation, animal disease, market failure, and insecurity (Little 2001). Unfortunately, the poor transportation and communication infrastructure in Turkana restricts trade and income generation opportunities.

The majority of livelihood diversification ventures have been in search of cash. While there is considerable debate over the importance of the market in pastoral diversification, with some condemning and others applauding it (see Hogg 1986; Fratkin 1991; Little 1992; Huntsman 1996; Bailey et al. 1999), most pastoralists have attempted to tap into, or even create, markets for their products. There is little evidence that pastoralists have diversified into service provision (Little et al. 2001). The transition from transhumant pastoralism to sedentary agriculture has been one of the most important forms of livelihood diversification, particularly along the Trowel and Keri rivers, where settled farmers and agro-pastoralists grow maize, sorghum, sukuma, oranges, mangos, bananas and vegetables (UNDP 2006). Farming has often been acclaimed as a viable risk management strategy (Campbell 1984, Smith 1998), while others viewed it as an unsustainable (even destructive) option that even accentuates risk (Hogg 1987, 1998). Fishing in Lake Turkana is another long-standing form of diversification. Fishermen along Lake Turkana migrate to follow fish movements. Pastoralists also supplement their livelihoods by selling fish. Many pastoralists have also taken up the weaving of mats and baskets, particularly near the Lake, where weaving material is readily available from the Doum Palm. Other natural resource-based livelihood diversifications have included the collection, processing and sale of aloe (UNDP 2006), gum arabic (Little et al. 2001), honey (UNDP 2006; Watson and van Binsbergen 2008b), wild fruits (ITDG

2005b), firewood (Little et al. 2001), and the production and sale of charcoal (Little et al. 2001) and alcohol (Little et al. 2001; ITDG 2005a). In addition, there is now more emphasis on the processing and sale of skins and hides (Little et al. 2001; Ajele 2005; UNDP 2006; Watson and van Binsbergen 2008b). Attempts have also been made to diversify into chicken production (Little et al. 2001), gold mining (ITDG 2005a) and petty itinerant, or kiosk-based trade (Little et al. 2001).

Gender is one of the key determinants of the options chosen for diversification (Little 2001). According to Field (2005), single women with children are most likely to try new income generating activities, even though resources are limited and individuals possess low levels of human capital (Field 2005). In general, women tend to move into petty trade, namely; milk, *uji* (porridge), mandazi (buns), wild fruit, processing and selling fish and/or animal skins, charcoal, firewood, alcohol, weaving (mats and baskets) and offer their services to fetch water and undertake household cores. Conversely, men frequently engage in livestock trading, fishing, carpentry, construction work, long distance hawking, provision of security services, and take advantage of comparatively more remunerative waged employment than women (which often involves labour migration) and sell poles, rent buildings, and own shops (including butcheries) (Little et al. 2001). According to Little (2001), waged employment is often prioritized as the most appropriate form of diversification to ensure food security.

Proximity to urban centres, Lake Turkana, and the permanent rivers (Turkwel and Kerio) also affects the number and range of options open to those interested in livelihood diversification. According to research undertaken by Little (2005), pastoralists residing less than 40 km from towns typically have more alternative income generating options than those living further away. Pastoralists residing within a 39-kilometre radius of towns indicated up to eleven different income activities compared to just seven activities for those living more than 40 km away (i.e. more than a day's walk) (Little 2001). Proximity to an urban centre is beneficial to residents because they can easily access amenities such as hospitals, water, electricity and schools that provide a free lunch. Most charitable organizations are located in the urban centres and residents can benefit from their assistance, especially food. Casual and permanent jobs are readily available in urban centres, and there is a ready market to sell food stuffs and other things like charcoal and woven items. In addition to the opportunities offered by urban centres, Lake Turkana offers fishing and tourism opportunities and both the Turkwel and Kerio Rivers offer the potential of irrigated agriculture, honey production, weaving, and agro-pastoralism.

However, on the whole, pastoralists are very traditional and are not usually known for their innovativeness or willingness to try new ideas particularly if self-esteem and self-reliance has been eroded as a result of a loss of livestock, time spent in relief camps, or as recipients

of charitable support (Field 2005). With the exception of relatively wealthy pastoralists in Turkana, livelihood diversification is generally perceived as an *ex ante* strategy adopted to reduce risk exposure (McPeak and Barrett 2001). There are many reasons why pastoralists diversify with considerable local variation in both the activities chosen and the rationale behind their choice (Little 2001). Pastoralists' diversification profiles illustrate clear dualistic tendencies, i.e. the richest diversify in order to promote economic growth and accumulate additional wealth, whereas the poorest diversify in order to survive (Little 2001). According to Little et al. (2001), mid-level income pastoralists tend not be so heavily involved in income diversification, something noted by Barth (1964) over 40 years ago.

Despite the lack of viable diversification options available to pastoralists in Turkana, Hogg (1989) suggested that a few, relatively wealthy, pastoralists had survived countless drought-related crises relatively unscathed as a result of livelihood diversification, specifically when pastoralists had diversified their incomes in the pursuit of relatively lucrative trading activities (Little 2001; McPeak and Barrett 2001), and skilled (higher income) waged labour (Little et al. 2001). The diversification profile of wealthier women also differs from that of relatively poorer ones. Wealthier women are more likely to rely on income generated from livestock, milk and ghee sales, compared to the petty trade of milk, vegetables, handicrafts, alcohol and local waged employment engaged in by the poorest women (Little 1992; Coppock 1994; Fratkin and Smith 1995).

In contrast, for the majority of pastoralists, livelihoods diversification in Turkana and other neighbouring districts (such as Marsabit and Moyale) are scarce and generally unremunerative specifically when individuals lack human capital (education) and access to significant financial capital (Little et al. 2001). According to Little et al. (2001), many livelihood diversification options, including accommodation, retail and processing businesses in town require significant amounts of cash for initial start-up (Little et al. 2001). As a result, the poor are generally relegated to marginal activities, characterized by firewood sales or charcoal production (Little 2001), the sale of their own unskilled labour, and forays into petty trading (Little et al. 2001). According to Little (2001), charcoal production and firewood/charcoal sales are examples of livelihood diversification activities undertaken only by the poor (Little et al. 2001). Furthermore, they are extremely laborious, generate little income (Little 2001), and are illegal. Diversification into non-farm activities is most commonly observed among poorer pastoralists driven by herd losses into unskilled waged labour and petty trade, as well as by young adults who have not yet accumulated herds (McPeak and Barrett 2001).

3 History of key livelihood-based interventions in Turkana

During the 1960s and 1970s, the Government of Kenya (GoK)—implementing an 'African Socialist' agenda—and the international donor community worked within a technical transfer paradigm and pursued a series of relatively uncoordinated, and generally unsuccessful, technical-based interventions in subsistence pastoral production systems. These interventions included attempts to: 1) improve livestock breeds or raise production (Catley et al. 2005; Mwangi and Dohrn 2006); 2) rehabilitate rangeland (Mwangi and Dohrn 2006); 3) improve water availability; 4) destock; 5) improve the control of livestock disease services; and 6) promote livestock marketing. In Turkana, the prevailing development philosophy underpinned significant investments in free government livestock services and the professionalization of veterinary services (Sandford 1983). During the 1970s, Turkana hosted regular livestock marketing interventions (ITDG 2005b). For example, through the Ministry of Livestock Development, the GoK supported the development and management of saleyards. In addition, the Livestock Marketing Division (LMD) of the Ministry of Agriculture acted as the principal buyer of livestock, most of which were sold in Uganda (Ajele 2005). Throughout this period, livestock marketing gained prominence.

During the early 1980s, Turkana District witnessed a series of state-led institutional interventions that focused either on the unsuccessful nationalizing and/or privatizing of dryland resources. Ultimately, however, pastoralists continued keeping large numbers of livestock, managed in accordance with traditional practices and institutions. According to many external experts, this strategy continued to exceed rangeland livestock carrying capacity (Mwangi and Dohrn 2006). During the late 1980s and 1990s, when budget restrictions began to bite, Kenya witnessed a general collapse of public services (Riviere-Cinnamond and Eregae 2003) and a concomitant increase in both the number and percentage of individuals living in poverty and striving to maintain basic livelihoods (Mupada and Ssebaganzi 2004). Sessional Paper No. 1 (1986) 'Economic Management for Renewed Growth' set the stage for structural adjustment within the GoK and the gradual privatization of public services (Young et al. 2003). Livestock services, regarded as an easy target for reform and privatization, were among the first to be down-sized. For example, it was during the late 1980s when the LMD also stopped buying livestock and private traders took over (Ajele 2005). In 1988, the GoK also stopped automatically employing all vets and Animal Health Technicians (AHT) on graduation and froze recruitment into vacant posts (Young et al. 2003). It was also planned to privatize many DVSs and to plough savings back into service delivery. Unfortunately, this did not happen. Instead, quacks quickly filled the void (Peeters et al. 2004). It was also during this time that the Junior Animal Health Assistants (JAHAs) were retrenched.

In an attempt to ameliorate the negative affects of structural adjustment in Turkana, the European Union (EU) sponsored the Turkana Rehabilitation Programme (TRP). This intervention aimed to improve forage resources, stock production and livestock marketing. TRP constructed six livestock development centres at Kakuma, Lokwamosing, Lorugum, Kaikor and Lodwar to facilitate disease control and training of pastoralists (Ajele 2005). In addition to TRP activities, ARID Lands (supported by the World Bank) constructed sale yards in Lodwar, Lorugum, Lokori, Kalemngorok, Kaaleng, Lokichoggio, Kakuma and Lokichar. NORAD, the Norwegian Government, also continued to promote livestock marketing by establishing and managing livestock sale yards (Ajele 2005).

However, despite continued efforts to support pastoralist livelihoods, communities in Turkana remain extremely vulnerable to external shocks, such as inter-tribal raiding, conflict over scarce natural resources, animal disease outbreaks and drought. This barrage of external shocks has eroded traditional livelihoods and compromised coping strategies leaving pastoralists susceptible to the degradation of their livestock herds and family units (Hall 2003). In concert with other key factors, climatic shocks during the past three decades have pushed an increasing number of pastoralists deeper into abject poverty, prompting huge flows of international humanitarian aid into Turkana and the ASALs generally (McPeak and Barrett 2001). With the exception of the one or two notable interventions discussed above, national governments, international agencies and International Non-Governmental Organizations (INGOs) have traditionally responded to the problems faced by pastoralists in Turkana by putting into place food relief mechanisms and emergency livestock vaccination and treatments programs. According to Blench (2000), these interventions resulted in maintaining unsustainable levels of human and livestock populations in the district.

3.1 Supply of primary animal healthcare in Turkana

During the colonial and early post-independence era, most clinical vet services in Kenya were provided by private practitioners and 'vet scouts'. The private practitioners were confined in high potential areas, mainly in the so-called white settler areas. Vet scouts were local livestock keepers who received informal training from local vet staff. Vet scouts were employed by the County Council and seconded to the GoK to provide clinical and other services at the village level (Young et al. 2003). Many veterinary services also used trained livestock herders to act as vaccinators in the control priority diseases or reporters of disease outbreaks. The use of herders as vet scouts and vaccinators during the colonial period demonstrated faith in their abilities to carry out important veterinary duties. However, following independence in the 1960s and 1970s, there was a reduction in the use of community-level animal health workers as new veterinarians and Animal Health Technicians (AHT) received formal training as part of the GoK's focus on professionalizing animal health

provision (Baumann 1990). During this period, vet scouts at village level were gradually phased out and replaced by Government vets and AHTs. Private practitioners, particularly in more remote/low potential areas, generally went out of business. Unfortunately, GoK vets and AHTs posted in remote ASAL areas were unable to reach nomadic herds because of the vast distances, poor terrain and poor road network, particularly without the support of vet scouts and other local-level intermediaries (Young et al. 2003). In addition, GoK vets and AHTs, based in ASALs (commonly referred to as hardship areas), frequently requested transfers to less remote areas (Young et al. 2003).

As a result of structural adjustment and ensuing budgetary crises in the 1980s and 1990s, GoK-backed animal health support in Turkana and the ASALs was decimated; virtually all clinical livestock interventions were terminated (de Haan et al. 1985). In many cases, the GoK was unable, or unwilling, to underwrite operational expenses. Many GoK vets received little more than their meagre official salaries, supplementing their income by selling small quantities of livestock drugs or providing other veterinary services (Leyland et al. 1998). In turn, GoK staff also lack the capital, training and stability (due to duty station transfers) to initiate their own private veterinary practices (Leyland et al. 1998).

In attempts to bolster the livestock sector in ASALs, the World Bank and European Commission placed increasing pressure on the GoK to privatize veterinary services (de Haan 1985). In 1994, the European Commission provided funds to the GoK to establish the Kenyan Veterinary Privatisation Association (KVPA), which, during the same year, implemented the Kenya Veterinary Association Privatisation Scheme. This scheme aimed to encourage GoK vets to set up private practices (Hall 2003; Young et al. 2003). Unfortunately, most GoK vets found ASALs unprofitable favouring the higher potential upland areas. Veterinary practices were unprofitable due to: 1) pastoralists' traditional reliance on free services (free from GoK or LNGOs, INGOs); 2) lack of infrastructure (good roads, communication- telephone etc.); 3) pastoralist mobility; 4) limited cash in the pastoralist economy; 5) poor understanding of the value of vet services; and 6) lack of capital resources for vets to establish their own practices (Leyland et al. 1998). Accordingly, many activists involved in veterinary science stressed the need for a range of key investments that would be required in order to establish private veterinary practices in Turkana. These include investments in infrastructure; pastoralist literacy; drug supplies; community participation; control of black market drug dealers; financial, technical and institutional support (Makerere University 2001). It was also recognized that there must be a willingness of vets to work in ASALs. Throughout the 1990s, the GoK was described as incapable of delivering primary animal healthcare in Turkana (Peeters et al. 2004). Throughout Turkana and across the ASALs, conventional GoK veterinary services consistently failed to establish effective or sustainable systems of delivery. Aside from the types of logistical problems highlighted above, this lack of success is also due to resource

constraints, organizational weaknesses, and professional biases against pastoralism (Catley et al. 1998). In the contemporary period, the District Veterinary Officer (DVO) is primarily involved in the monitoring and control of economically important diseases including rinderpest and Foot and Mouth Disease.

3.2 Contemporary demand for primary animal healthcare in Turkana

Whilst some unsubsidized animal health drugs were considered out of reach (Kang'ara et al. 1997), there was a steady low level demand for competitively priced livestock drugs from a growing number of pastoralists who were convinced about their importance with regard to livestock health. Unfortunately, as the provision of GoK animal health services had all but disappeared and there was no discernable private sector veterinary service, fake vets or 'quacks' moved in to meet this demand (Farm-Africa 2002; Mutungi 2006). However, whilst pastoralists are extremely experienced in disease diagnosis and the use of ethno-veterinary medicines, they lack the knowledge to determine the ethical use, dosage rates, and route of administration, and quality or proper price of modern medicines. This situation allowed quacks to misuse livestock drugs and provide spurious advice (Farm-Africa 2002; Mutungi 2006). As a result, livestock production suffered as major diseases and livestock related problems were not treated efficiently or effectively (Leyland and Akabwai 1998). In a study carried out by Watson (2006), 100% of Turkana pastoralists sampled identified animal healthcare as a key livelihood intervention required in times of drought.

4 Stepping into the livestock services and development vacuum

In attempts to ameliorate the devastating impacts of insecurity, over-stretched natural resources, poverty and poor credit facilities, poor drought preparedness, trans-boundary livestock diseases and the lack of integration of new technologies, various international and local NGOs sought to support the livelihoods of pastoralists in Turkana (Peters et al. 2004). This support primarily came in the form of: reinforcing local management capacities; assisting in the control of livestock pests and diseases; provision of water; destocking and restocking interventions; and improving the sustainable use of natural resources (see Table 1). In addition, INGOs have recently attempted to introduce pastoralists to the cash economy and promote market integration through the development of livestock sale yards, slaughter houses, market days and marketing associations. According to Watson (2006), pastoralists are becoming increasingly market-oriented in Turkana. Whilst the sample was small, 32 out of 40 pastoralist respondents in Turkana cited a lack of livestock markets and poor livestock prices as key livelihoods challenges. Furthermore, 60% indicated that, in response to drought, they traditionally sold livestock in order to purchase food. In early stages of the drought of October 2005, 62.5% of the pastoralists surveyed indicated that they were already selling livestock in order to purchase food and water. When asked about their preferred livelihoods interventions, 67.5% of respondents prioritized food relief and financial support for small-scale business, 60% preferred assistance in enhancing community water storage, and 57.5% requested assistance in restocking. When asked about their preferred livestock intervention, 100% indicated animal healthcare, and 50% indicated the provision of water.

Table 1. *Principal areas of livelihood interventions in Turkana*

Principal areas of intervention	No of key INGOs involved
Primary animal healthcare	7
Water management	6
Livestock marketing	5
Capacity building	5
Food relief	4
Conflict resolution	4
Destocking and re-stocking	3
Income generation	3
Education	3

However, whilst the insights highlighted above give cause for optimism, the establishment and institutionalization of livestock markets and marketing activities has been a major challenge. According to ITDG (2005b), the level of engagement in livestock marketing interventions has been low due to poor ownership by pastoralist communities. Currently, the

district has 12 livestock markets represented by sale yards. They include Lodwar, Katapakin (Kerio), Lomil, Kalimnyang, Namuripus, Kakuma, Lokichar, Lokori, Kaaleng, Lorugum, Kalemngorok and Lokichoggio. However, not all these are fully functional and active, and only 40% of these centres have designated market days (ITDG 2005b).

4.1 Supporting animal healthcare in remote locations

4.1.1 Role of INGOs

By the late 1980s and early 1990s, it was all too evident that increasing financial constraints brought about by structural adjustment programs had effectively paralysed government services in Kenya and that alternatives were needed for delivery of animal health services in ASALs (Riviere-Cinnamond and Eregae 2003). The crisis left livestock producers in Turkana without critical veterinary services and exposed them to unregulated and unreliable pharmacists and quacks (Ly 2002). In an attempt to ameliorate the situation, many INGOs began utilizing community animal health workers (CAHWs), which had proven their worth after resurrection in the mid-1970s in Ethiopia (Sandford 1981). Veterinarians in Sudan had also been promoting the paravet, barefoot vet (Darroch et al. 1982; White 1998) or similar type of worker (Schwabe 1980; Halpin 1981; Schwabe and Kuojok 1981) and in Somalia; Nomadic Animal Health Auxiliaries (NAHAs) were used to good effect in the central rangelands (Baumann 1990). These experiences coincided with the development of decentralized animal health projects in Nepal and India with support from the United Mission of Nepal and the Intermediate Technology Development Group (ITDG) in the early 1980s (Mulvaney 1984; Hadrill 1989). During this time, INGOs were also increasingly influenced by the World Bank's call for new privatized livestock services in sub-Saharan Africa (de Haan 1985). In the 1980s, community-based animal health services were introduced in Kenya to fill the primary animal health void that existed (CARE 2002). This new model of community-based livestock services was rooted in renewed interest in indigenous knowledge and the use of participatory methods to promote a more client-focused approach to problem prioritization and the identification of more appropriate solutions (Leyland 1991; Catley et al. 2005). According to Young et al. (2003), the first community or decentralized animal health (DAH) scheme in Kenya was established in 1980 by an INGO working in Turkana District. This model of animal healthcare delivery gradually evolved into the Adakari Vet Scout Programme, which was promoted by both NORAD and the TRP (Young et al. (2003). During this period, several INGOs, particularly ITDG and Oxfam UK/Ireland initiated CAHWs schemes (Catley 1999; Riviere-Cinnamond and Eregae 2003). For example, ITDG, one of the most ardent supporters of this approach initiated CAHW schemes in Kamujini and east Pokot in 1987; Machakos in 1988, Makueni and Samburu in 1989, and Turkana in 1990 (ITDG 2000b; 2000c). By March 2003, 102 CAHWs were active in Turkana reaching more animals than the GoK veterinary officers (Peters et al. 2004).

Experiences from INGO-initiated CAHWs approaches began to appear more frequently in the informal development literature: Senegal (Obel-Lawson 1992); Chad (Young 1992; Peters 1993; Hammel 1995); Kenya (Blakeway 1993); Afghanistan (Leyland 1993); Sudan (Young 1992; Dahir 1993); Uganda (Young 1992); Ethiopia (Young 1992); Guinea, Mauritania, Niger, Senegal and Togo (VSF 1998). However, whilst often acknowledged as highly successful (Hopkins and Short 2002), it took over 15 years to convince policy makers to develop policies and legislation to allow the approach to be used legally in Kenya (Young et al. 2003).

4.1.2 Role of Community Animal Health Workers (CAHWs)

What is a CAHW?

CAHWs are livestock keepers or herders who live in the communities, moving with the herds during seasonal migrations (Hank et al. 1999) often to inaccessible (CBW Project 2006) and insecure areas (Jones et al. 1998). The livestock owning community members agree to select individuals, usually from within their own communities, who are willing (Akabwai 2001) and enthusiastic, and whom they trust and respect, to be trained as CAHWs. The involvement of the community in the selection process is used to encourage community ownership. They agree to utilize the trained CAHWs and to pay for their services. The community advises the CAHW on the problem diseases that they are willing to pay to control. They also agree on how and when to address these diseases (CBW Project 2006). CAHWs are supervised by community elders and agree to be trained and to provide specified vaccination and clinical services at agreed prices and to work under the professional co-supervision of a veterinarian or a mid-level veterinary worker (Leyland et al. 1998). The CAHWs gain from developing a skill, through enhancement of their social status (Leyland et al. 1998), and, ultimately, makes a living from profits gained from the sale of drugs (CBW Project 2006). Individuals take on the role of CAHWs on a part time or full-time basis (CBW Project 2006). Due to socio-cultural factors, the majority of CAHWs are young males, but females and old persons may also be selected (CBW Project 2006). CAHWs are usually given elementary training in animal healthcare (intensive 2 weeks Leyland 1997) and extensive 3 months - Grace 2001), and are provided with a basic veterinary kit (for the purpose of providing basic animal healthcare to their communities) (Hall 2003). In Turkana, VSF-Belgium, Arid Lands, and SNV have all trained and supported CAHWs (Key Informant interview – current study).

The services provided by CAHWs include: 1) diagnosis and treatment of livestock diseases (plus record keeping and follow-up if necessary) (Makerere University 2001); 2) sale of western and ethno veterinary drugs (CBW Project 2006); 3) referral of difficult clinical or surgical cases to the supervising veterinarian or Animal Health Technician (AHT) – currently hampered by lack of qualified vets; 4) giving advise to livestock owners

on marketing of livestock and livestock products; and 5) promotion of animal welfare and good livestock management practices. In addition, CAHWs may also provide advice on breed improvement; monitor herd health and production; and help in the conservation of natural resources (Grace 2001). Furthermore, CAHWs are often used in a public good capacity by DVOs and INGOs to: mobilize communities; assist in vaccination campaigns; report on key diseases (CBW Project 2006); provide useful links between livestock keepers/herders and district veterinary authorities and facilitating agents (CBW Project 2006); provide information on disease control and prevention, public health issues including meat and milk hygiene to avoid zoonotic diseases (CBW Project 2006) and; to sensitize communities on policy and legislative issues relating to the livestock sector. In this capacity, emphasis is placed on community sensitization on the handling of veterinary drugs, imposition of quarantines and livestock movement restrictions and their relevance to disease control, monitoring and control of notifiable diseases (such as rinderpest, CCPP, goat pox, and CBPP) (Leyland et al. 1998), and collection of samples from sick animals for submission to the supervising veterinarian or AHT, when necessary (Grace 2001).

What are the key strengths of the CAHW approach?

Whilst it can be assumed that a publication bias exists for CAHWs programs (Grace 2001), namely, the most successful cases are publicized, significant evidence exists supporting a range of key strengths. CAHWs are seen as key components of an efficient, cost-effective system of privatized veterinary services in remote (Hank et al. 1999; Kasirye 2001; Makerere University 2001; Hall 2003; CBW Project 2006) and/or insecure (Catley et al. 1998) areas where no modern primary animal healthcare exists (Hank et al. 1999). They are acclaimed for facilitating better access for pastoralists to a range of low-cost (Catley et al. 1999; Akabwai. 2001), effective (Grace 2001), traditional (Farm-Africa 2002) and modern curative and preventative livestock healthcare products, often on a flexible payment system (Hank et al. 1999). Indeed, CAHWs have been accredited with creating employment opportunities for vets by mobilizing market demand for veterinary services. CAHWs have also played a crucial role in both Government and INGO vaccination programs (Catley 1999), (specifically in the control of Rinderpest) (Catley et al. 1998), and provide a durable link between DVS and communities, specifically with respect to disease surveillance (Leyland et al. 1998). CAHWs are also effective, and socially accepted (Leyland et al. 1998), point of contact (Kasirye 2001) with pastoral communities, which are often difficult to contact due to their transhumant nature. CAHWs have also been recognized as a key component of capacity building, particularly with respect to enhancing human and social capital and improving livelihood coping strategies and promoting more sustainable forms of rural development (Leksmono and Young 2002).

What are the key weaknesses of the CAHW approach?

The most important and resonant complaints associated with the use of CAHWs relates to their capacity to provide quality primary animal healthcare. CAHWs are often regarded as non-professionals (Catley 1999; Hank et al. 2001; Hall 2003; CBW Project 2006) who lack sufficient knowledge, technical competence (Catley et al. 1998; Hank et al. 2001) and experience to deliver a quality service. In part, these concerns relate to the quantity and quality of initial training (Hank et al. 2001; Farm-Africa 2002) and refresher training received (Makerere University 2001; Farm-Africa 2002; CBW Project 2006) and the lack of adequate supervision (Akabwai 2001; Catley et al. 1998) monitoring (CBW Project 2006) and regulation (CBW Project 2006), and high levels of illiteracy amongst CAHWs. For many veterinarians, the inability of CAHWs to correctly diagnose diseases is a key concern (Catley et al. 1998; Hank et al. 1999; Farm-Africa 2002). As Catley and Nalitolela (2002) point out, 'some important diseases "look the same". They show similar clinical signs and can only be distinguished using laboratory tests or other diagnostic procedures. To complicate matters, an animal can also be suffering from two or more diseases at the same time. In remote areas, the nearest laboratory can be many kilometres away and blood or tissue samples are easily spoiled in transit to the laboratory. Even when diagnostic tests are available for field use, veterinarians can lack the specialist skills required to use and interpret the tests correctly. If identification of a disease problem is incorrect, CAHWs will be trained to prevent or treat the wrong disease'. Indeed, many professional veterinarians and government officials fear that the use of CAHWs could lead to abuse (CBW Project 2006), misuse; or unnecessary use of drugs and pose the danger of development of drug resistance in animals (CBW Project 2006), and raise public health (CBW Project 2006), and international trade concerns (CBW Project 2006). Furthermore, 'even when diseases are correctly identified and successfully controlled in the short term, long-term control strategies require an understanding of the epidemiology and economics of disease. The epidemiology of livestock diseases is often complex and the suboptimal use of medicines can lead to drug resistance' (Catley and Nalitolela 2002). Whilst the situation is slowly beginning to change, the general institutional and policy context of CAHWs remains a challenge. Many professional veterinarians often linked directly or indirectly with the national livestock policy processes remain hostile to formal legislative sanctioning of use of CAHWs (Catley et al. 2005).

The CAHWs approach is also criticized on operational grounds. Indeed, many commentators insist that CAHWs do not live up to the bold claims often made for them. For example, while CAHWs are acclaimed for their ability to significantly enhance the geographic and socio-political coverage of primary animal heath care networks in ASALs, many commentators consistently stress the problems faced by CAHWs in delivering services (quality and otherwise) to remote (Hall 2003) and/or insecure (Farm-Africa 2002) areas, particularly when

compounded by extreme environmental challenges, namely, drought (Hall 2003). In part, the limited geographic coverage noted in many CAHWs networks is often attributed to the lack of functional integrity (Makerere University 2001), i.e. breakdown of the privatized Veterinary-AHA-CAHWs network Hank et al. 1999), and the often *ad hoc* recruitment, deployment (Kasirye 2001) and coordination (Catley et al. 1998) of CAHWs by INGOs and government actors. The breakdown in the primary animal healthcare networks often manifests itself in the failed or inadequate supply of drugs (both quantity and range). This situation reduces the credibility and trust of CAHWs (Hank et al. 1999). Furthermore, CAHWs networks are also questioned on their capacity to deliver public goods on behalf of INGOs and national governments. CAHWs are often criticized for not living up to their potential role in emergency disease preparedness, especially when disease outbreaks occur during times of drought (CBW 2006), their role in disease surveillance (Catley 1999) and their provision of a quality service during emergency livestock interventions (Hank et al. 1999).

However, possibly the greatest weakness of the CAHWs approach is the lack of financial robustness. In part, this has been blamed on over dependence on NGO and donor support (Leyland et al. 1998; Riviere-Cinnamond and Eregae 2003; CBW Project 2006), lack of market integration in ASAL areas, and competition with other livestock drug providers. The lack of market integration in pastoral areas has been identified as a major hindrance to service delivery by CAHWs (CBW Project 2006). Whether due to cultural norms (Kafeero and Namirembe 2003), ignorance of the benefits of modern veterinary medicine (Makerere University 2001), lack of cash (Makerere University 2001), or as a result of years of subsidized (Hall 2003) or free provision, pastoralists are often unwilling (Catley et al. 1998; Hall 2003), or unable (Catley et al. 1998) to pay for animal health services. When made, payment is often in-kind (Farm-Africa 2002) or deferred (Makerere University 2001), until money is available. Payment in-kind is a risk for the CAHW as animals often fetch low prices, are stolen or die due to drought or sickness. This, in conjunction with poor business management (Makerere University 2001), reduces the CAHW's ability to replenish drugs. Often, CAHWs only receive payment from sale of drugs (Hall 2003) and not for the provision of other services. CAHWs often work on credit and incur significant transaction costs (Makerere University 2001) when accessing extremely remote areas, exposing their business to even greater vulnerability. The situation is further compounded by an acute lack of entrepreneurial (CBW Project 2006) or business management (Makerere University 2001) skills possessed by many CAHWs, and the theft of money and/or drugs (Catley et al. 1998). Ironically, in addition to the lack of market integration, competition with black market drug suppliers (quacks) (Hall 2003), animal health services provided by livestock marketing associations (Hall 2003), and direct sales from pharmacies (Hall 2003), are also cited as key constraints to the financial viability of CAHWs. Subsequently, there are relatively high drop-out rates for CAHWs. According to CBW Project (2006), up to 35% of the 8,652 CAHWs sampled had ceased operating.

Improving the CAHW system

Suggested improvements to the CAHWs approach to delivery of primary animal healthcare in ASALs can be broken down into two broad categories: supply-side and demand-side adjustments. On the supply-side, it is suggested that the underlying quality of primary animal healthcare can be improved by providing CAHWs with a salary (Riviere-Cinnamond and Eregae 2003) and regular refresher training (Riviere-Cinnamond and Eregae 2003) and ensuring adequate supplies of veterinary medicines (including the establishment of more drug stores) (Riviere-Cinnamond and Eregae 2003). In addition, it is believed that the geographical coverage of CAHWs could be significantly enhanced by the provision of a means of transportation (Riviere-Cinnamond and Eregae 2003) and the selection of more women CAHWs (CBW Project 2006) to service base-camp livestock. It is also suggested that the functionality of privatized veterinary networks could be improved by encouraging the establishment of more AHAs and veterinarians in ASALs (Hank et al. 1999). In addition, it has also been suggested that livelihood strategies comprising multiple income sources would be more sustainable than the reliance on livestock animal healthcare as the sole income source (Hall 2003). The provision of business management/micro-enterprise training (Farm-Africa 2002) is seen as essential for both the successful management of CAHW's core animal health businesses as well as their diversified businesses.

On the demand side, many believe that development actors should support livestock marketing initiatives as a means of generating more cash in the ASAL economies (Leyland et al. 1998). It is also believed that these initiatives would be complemented by the development of credit mechanisms for pastoralists (Farm-Africa 2002) and encouragement of greater community support for, and involvement in, primary animal healthcare systems (Farm-Africa 2002).

4.2 The Farmer Field School (FFS) approach

4.2.1 Origins of the FFS approach

Originally, FFSs were developed in Asia as a result of severe losses in rice production caused by the brown plant hopper (Nilaparvata lugens Stål) (Conway and McCauley 1983; van de Fliert et al. 1995; Winarto 1995) and the apparent failure of the conventional research, development, and extension paradigm to affect meaningful change. The initial FFS for integrated pest management (IPM) on rice was subsequently broadened in a second generation of FFS to address other crops and topics such as livestock, community forestry, HIV/AIDS, water conservation, soil fertility management (Mureithi et al. 2002; Rijpma et al. 2003), food security and nutrition, organic agriculture, vegetables, cotton IPM (Ooi 2003; Ooi et al. 2004), land and water management (Rusike et al. 2004; Hughes and Venema 2005;

FAO/IIRR 2006), conservation agriculture, land degradation, agroforestry (Ochoa 2003), food security, nutrition, fishing (Bartley et al. 2004) and biodiversity (218; Meijerink et al. 2005) poultry and dairy cows (LEISA, 2003a; LEISA 2003b; AGRIDAPE 2003; CIP-UPWARD 2003), advocacy (Rahadi and Widagdo 2002), to income-generating activities such as handicrafts (Anandajayasekeram et al. 2007). The FFS approach has been implemented in at least 78 countries across much of Asia, sub-Saharan Africa, Latin America and the Caribbean, the Near East, Middle East, North Africa and Eastern/Central Europe (Nelson et al. 2001). Currently, there are over 500 operational FFS in Kenya (Minjauw and Romney 2002).

4.2.2 What is FFS?

The FFS approach represents a paradigm shift in agricultural extension and can be viewed as a capacity-building investment in the sector of education, information, and training. The training program utilizes participatory methods 'to help farmers develop their analytical skills, critical thinking, and creativity, and help them learn to make better decisions' (Kenmore 2002). Essentially, the FFS model provides an opportunity for a group of individuals that share similar livelihood challenges and to engage in a process of learning-by-doing, based on principles of non-formal education. This approach reflects the four elements of the 'experiential learning cycle': 1) concrete experience, 2) observation and reflection, 3) generalization and abstract conceptualization, and 4) active experimentation (Braun et al. 2000). The FFS approach is particularly adapted to field study where specific hands-on management skills and conceptual understanding of complex livelihood environments is required (Anandajayasekeram et al. 2007).

4.2.3 What is the aim of FFS?

The aim of FFS is to build farmers' capacity to analyse their production systems, identify problems, test possible solutions and eventually adapt the practices most suitable to their farming system. The knowledge acquired during the learning process enables farmers to adapt their existing technologies to be more productive, profitable, and responsive to changing conditions, or to test and adopt new technologies through a process of participatory technology development. FFS aims to increase the capacity of groups of farmers to test new technologies in their own fields and to assess the relevance of results to their particular circumstances (Braun et al. 2000). They interact on a more demand-driven basis with the researchers and extension workers, looking to these for help where they are unable to solve a specific problem amongst themselves. In summary, a Farmer Field School (FFS) is a forum where farmers and trainers carry out collective and collaborative inquiry, debate observations, apply their previous experiences and present new information from outside the community with the purpose of initiating community action in solving community problems

(Minjauw 2001). The specific objectives of the FFS approach is to: 'empower farmers with the knowledge and skills to make them experts in their own fields; sharpen the farmers' ability to make critical and informed decisions that render their livelihood systems profitable and sustainable; sensitize farmers in new ways of thinking and problem solving; and, help farmers learn how to better organize themselves and their communities. In addition, the FFS approach also helps to: shorten the time it takes to get research results from the stations to adoption in farmers' fields by involving farmers' experimentation early in the technology development process; enhance the capacity of extension staff, working in collaboration with researchers; serve as facilitators of farmers' experiential learning; and, increase the expertise of farmers to make informed decisions on what works best for them, based on their own observations of experimental plots in their field schools and to explain their reasoning' (Minjauw 2001). After the FFS, typically one to two seasons, farmers graduate with new skills. In fact, many groups of farmers in FFSs decide to continue their group as some type of informal or formal association as they have built trust and confidence together. There is also an emerging trend towards marketing networks of FFSs that cooperate as larger units. A critical function of FFS approach is the ability to scale-up and scale-out.

4.2.4 How does a FFS achieve its aims?

The basis for a successful FFS starts with the program's culture of operation—from a nurturing and empowering program leader and good facilitators, to transparent budgets and open management. Training follows the seasonal cycle and is related to the seasonal cycle of the practice being investigated (Minjauw 2001). Ground working activities include: identification of key enterprises; identification of priority problems and potential solutions; establishment of farmers' practices; identification of field school participants and field school sites; and preparation of grant proposals (agreed FFS activities that external donors fund). Thereafter, facilitators, who are often extension agents of NARES, conduct learning activities in the field on relevant agricultural practices (Vasquez-Caicedo et al. 2000). The training process for facilitators focuses on the identification of crop/livestock production and health technologies suitable for application and the development of field guides on how to effectively deliver crop/livestock production and protection topics using participatory non-formal education methods. Facilitators are trained in participatory technology development (PTD), participatory methodologies and non-formal education methods, group dynamics and locally important special topics. Each FFS needs a technically competent facilitator to lead members through the hands-on exercises. There is no lecturing involved, so the facilitator can be an extension officer or a Farmer Field School graduate. Extension officers with different organizational backgrounds, for example government, NGOs and private companies, have all been involved in FFS. In most programs, a key objective is to move towards farmer facilitators (Braun 1997), because they are often better facilitators than outside extension staff since they know the

community and its members, and also speak a similar language (van de Fliert et al. 1995), and are recognized by members as colleagues, and know the area well. From a financial perspective, farmer facilitators require less transport and other financial support than formal extensionists. They can also operate more independently (and therefore cheaply) outside formal hierarchical structures. All facilitators need training. Extension facilitators need season long training to (re)learn facilitation skills, learn to grow crops with their own hands, and develop management skills such as fund-raising and development of local programs (Braun et al. 2000). The facilitator's role and attitude are key factors in determining the success of an FFS. His or her duties include serving as catalyst, encouraging analysis, setting standards, posing questions and concerns, paying attention to group dynamics, serving as a mediator and encouraging participants to ask questions and come to their own conclusions (Braun et al. 2000).

Participatory approaches, which facilitate farmer demand for knowledge, give an opportunity to the end users to choose, test and adapt technologies according to their needs. Through participation in FFS, farmers develop skills, which allow them to continually analyse their own situation and adapt to changing circumstances. The ILRI livestock FFS project, funded by the DFID Animal Health Programme, is testing and adapting a participatory method to create a sustainable relationship between farmers, extension officers and research institutes. These relationships are thought to be a fundamental tool for scientists to collect appropriate data and to transform developed technologies into products adapted to the end user needs (Minjauw and Romney 2002). Since the facilitator cannot be an expert in every subject, he/she will help the farmer community to invite the right person to talk about the subject chosen by the farmers. This empowers the FFS group to contact other organizations like NGOs, national or international research institutes (Braun et al. 2000). If scientists or subject matter specialists are invited to work with a particular FFS, their role is generally to provide backstopping support and in so doing to learn to work in a consultative capacity with farmers. Instead of lecturing farmers, their role is that of colleagues and advisers who can be consulted for advice on solving specific problems, and who can serve as a source of new ideas and/or information on locally unknown technologies.

Ultimately, FFS is basically a group of people with a common interest. The group may be mixed or organized by gender, and could be an established group, such as a self-help, women's, or youth group. Groups meet regularly at agreed intervals usually every 1 to 2 weeks (Minjauw et al. 2002). Group training includes group team building, communication skills, problem solving, and leadership, and discussion methods (Minjauw 2001). Each FFS meeting includes a group dynamics exercise to strengthen teamwork and problem-solving skills, promote creativity and create awareness of the importance and role of collective action. The facilitator suggests a problem or a challenge for the group to solve. In the FFS,

the field is the teacher, and it provides most of the training materials like plants, pests and real problems. Any new 'language' learned in the course of study can be applied directly to real objects, and local names can be used and agreed on. Farmers are usually much more comfortable in field situations than in classrooms. In most cases, communities can provide a study site with a shaded area for follow-up discussions.

The main participatory techniques used include: agro-ecological system analysis (AESA) (originally developed by Conway (1985 and 1987) with Thai colleagues) (Braun et al. 2000) and participatory technology development (PTD). The FFS curriculum follows the natural cycle of its subject, be it crop, animal, soil, or handicrafts. For example, the cycle may be 'seed to seed' or 'egg to egg'. This approach allows all aspects of the subject to be covered, in parallel with what is happening in the FFS member's field. For example, rice transplanting in the FFS takes place at the same time as farmers are transplanting their own crops and the lessons learned can be applied directly. Farmers generate their own learning materials from drawings of what they observe to the field trials themselves (Minjauw 2001). To stimulate interest in FFS beyond the immediate participants, the field school invites the whole village and farmers from neighbouring villages to attend the harvesting of its plots and participate in analysis of results. The Indonesian national IPM program and many local governments have sponsored facilitator meetings and the attendance of FFS alumni at technical workshops and planning meetings. The resulting farmer trainer networks develop strategies for training other farmers and influencing local agricultural policies (Braun et al. 2000).

The first activity of the FFS is to prepare a grant proposal including a detailed work plan with a corresponding budget. The grant covers all costs associated with their selected activities (including facilitation costs). Farmers are encouraged to contribute weekly donations, often generated through cash crop production. The farmers pay for the transport and lunch allowances for the extension worker to visit, empowering them in obtaining a quality and sustainable extension service (Minjauw and Romney 2002). The cost profiles of FFS projects vary considerably, between settings and content, as well as over time. FFS costs per farmer range from US$1–50 and can ultimately be costly undertakings (Godtland et al. 2004). Farmers with a good record of attendance are graduated for the specific activities completed during the FFS meetings, farmers run FFS, and follow up by facilitators (Minjauw 2001).

4.2.5 Strengths of the FFS approach

Key strengths of the FFS approach can be broadly categorized as: the enhancement of human and social capital and a key entry point for new practices and technologies. The FFS approach is often cited as providing a vital source of new skills and information

(Nathaniels 2005) and for its holistic systems, and seasonal approach to the generation of new knowledge, understanding, and application (Godtland et al. 2004). According to Anandajayasekeram et al. (2007), FFSs have had a remarkable impact in terms of reducing farmers' use of pesticides, increasing their on-farm productivity, improving their knowledge base, information and decision sharing, group management of finances, trust among members, general group dynamics (Fujisaka 2000), and empowering rural communities. In many studies, authors have noted the high correspondence of FFS technical curriculum to farmers' current needs (Nathaniels 2005) and that the FFS approach acted as a catalyst of farmer experimentation, leading to adoption, and adaptation, of new practices that are well suited to local contexts and local challenges. The FFS approach is also acclaimed to enhance the development, and often institutionalization, of social capital. This primarily takes the form of the enhancement of local organizational structures (Simpson 2001), both social and political, and the catalysis of knowledge sharing networks (including improved livestock disease surveillance in remote locations) (Minjauw et al. 2002; Nathaniels 2005). Lastly, the FFS approach is often acclaimed as a key component in research for development systems, acting as an excellent conduit for the introduction of appropriate new practices and technologies (Godtland et al. 2004).

4.2.6 Weaknesses of the FFS approach

A number of key weaknesses of the FFS approach have also been identified, namely problems associated with: applying the standard FFS format (Nathaniels 2005); addressing the complex needs of mobile communities; technologies only partially meeting participant's needs (Nathaniels 2005), particularly where local challenges are extremely complex or multi-dimensional and/or where there is little or no control over key factors; experimentation dominated by the local elite (Nathaniels 2005) marginalization of the extreme illiterate poor; lack of effective networking (Nathaniels 2005); and, the relative high unit costs of FFS compared to other methods of adult education and capacity building (Quizon et al. 2000; Adegeye and Carsky 2003; Feder et al. 2003). In addition, there is little evidence of diffusion of knowledge and practices from FFS graduates to other farmers beyond the local level (Godtland et al. 2004). Indeed, according to Anandajayasekeram et al. (2007), FFSs are having limited or zero impacts on the overall economic performance of national agriculture sectors, environmental sustainability, and rural health. Although these limitations have not been addressed, the current expansion in the use of FFSs could almost be categorized as exponential (Anandajayasekeram et al. 2007).

5 Community farmer field school animal health facilitators: A possible hybrid?

5.1 Potential synergisms

With a dearth of alternative candidates in remote and/or insecure areas, the use of existing CAHWs (Dalsgaard et al. 2005), particularly those who are tried and tested, and well respected (Stewart 2002), as integral actors in the pastoral communities, offers a potentially low-cost and effective approach to the facilitation of Livestock Farmer Field Schools (LFFS) (Leyland et al. 1998). CAHWs are already recognized as key components of human and social capacity building activities in pastoralist areas. CAHWs bring knowledge of both modern and traditional approaches to livestock healthcare and production, topics which are likely to be high on the agenda in the LFFSs. They also offer the promise of building and strengthening local dialogue (Stewart 2002), organization, and networks (New Agriculturist 2004), of which they are already a part, and of being a key catalyst for change (Stewart 2002). From the CAHWs perspective, LFFSs offer the indirect benefits of improving the cash income, new business diversification opportunities and an opportunity to develop their own business and entrepreneurial skills. In addition, the in-direct benefits to CAHWs of LFFS facilitation could include the development of a greater awareness and understanding of the importance of disease surveillance; preventative and curative treatments; livestock productivity; and livestock marketing, which in turn could generate more community interest in, and demand for, animal healthcare and other income earning opportunities (Stewart 2002). Furthermore, improved networks and communication could also potentially equate to improved prices for livestock and livestock products (Stewart 2002).

5.2 Potential antagonisms

From an LFFS perspective, potential antagonisms arise from several quarters. Questions have arisen regarding the competence (Stewart 2002) and willingness of CAHWs to act as LFFS facilitators. Indeed, as discussed earlier, in some situations, CAHWs systems have already been questioned over their ability to provide a robust animal healthcare service to the poor and illiterate, particularly in remote, insecure and environmentally challenging situations. In addition, high levels of facilitator illiteracy may impede CAHWs from delivering the quality of service expected and alienate pastoralist communities to future LFFS-styled interventions. Furthermore, as noted earlier, several reports question the effectiveness of CAHWs in developing and strengthening networks and local organizational capacity. At a more strategic level, the pastoralist context is far removed from the context in which FFS was designed to work, namely areas of sedentary agriculture characterized by predominantly literate farmers and clear private property-rights (New Agriculturist 2004). At a more operational level, there

is a real danger that, with questionable levels of human capital, CAHWs may find that a difficult context for implementing LFFSs, combined with the fact that many key variables are likely to be outside their control or meaningful influence, results in little meaningful development taking place. In addition, there is a real danger that LFFS groups will, at some stage, take over the role of supplying animal drugs (Leyland et al. 1998), threatening the financial viability of CAHWs.

6 Initial assessment of the hybrid CAHWs/LFFS approach in Turkana

6.1 Methodology

In an attempt to assess the validity of using CAHWs as LFFS facilitators and their progress to date, field work in Turkana utilized, tried and tested participatory approaches in the form of Focus Group Discussions (FGD) and a FGD of Key Informants. In an attempt to generate accurate data, FGDs were conducted at four key levels: 1) key GoK and INGO development actors; 2) CAHWs; 3) CAHWs/LFFS facilitators; and, 4) LFFS students. Key questions were asked in all four levels in order to triangulate data and generate more credible insights.

- The FGD of Key Informants included two representatives from Oxfam GB, one representative from ITDG Practical Action, VSF-Belgium and Arid Lands and the District Livestock Marketing Officer for Turkana. The group was asked three open-ended questions on: a) What are the strengths and weaknesses of past development interventions in Turkana (particularly those related to primary animal healthcare and adult education)? b) How well does the current primary animal healthcare system in Turkana function? C) How well suited are CAHWs for their role as LFFS facilitators? Appendix 1 contains the full crib sheet used in the FGD.
- CAHWs were selected to take part in the FGD based on a random stratified sampling frame (a combined list of CAHWs trained by both VSF-Belgium and SNV) of Central and Southern Turkana. Three strata were identified: a) Active CAHWs working as LFFS facilitators; b) Active CAHWs not working as LFFS facilitators and; c) Failed or failing CAHWs. In all, 15 CAHWs were invited to attend the FGD in Lodwar, Turkana, 5 from each strata. In practice, only 11 CAHWs were able to attend the FGD. This group comprised 5 active CAHWs working as LFFS facilitators, 4 active CAHWs not working as LFFS facilitators and 2 failed or failing CAHWs (Appendix 2 contains the crib-sheet used in the FGD).
- The 5 CAHWs LFFS facilitators who took part in the FGD outlined above were selected for a third FGD designed to capture their experiences to date in the LFFSs (Appendix 3 contains the crib-sheet used in the FGD).
- In all, FGDs were held in 9 of the 10 pilot LFFS locations; flooding prevented access to the 10th LFFS site. In the 9 LFFS FGDs, a total of 220 students took part, representing 82% of the total population of pilot LFFS students (268) in the 9 locations. Appendix 4 contains the crib-sheet used in the FGD.

6.2 Robustness of the CAHWs system in Turkana

6.2.1 Overview

Whilst no attempt was made to assess efficiency and cost-effectiveness, it was evident that, on the whole, the CAHWs system in Turkana worked well, broadly substantiating earlier

claims made in this report about the value of CAHWs. During the FGD of Key Informants, there was an overwhelming sense that the current system of CAHWs is very good (Arid Lands), even without the use of more qualified animal health assistants and private veterinarians. Indeed, the Oxfam representative added that the use of CAHWs was the only feasible way to deliver primary animal healthcare in Turkana. This sentiment was also echoed in the CAHWs FGD. All bar 1 of the CAHWs FGD participants stated that the system in place (VSF-B, Ministry of Agriculture and CAHWs) was good. They stressed that livestock drugs were now available in the community and the number of livestock fatalities had declined due to increased knowledge and skills in both preventative and curative treatments and the ability to administer accurate drug dosages (see Table 2). All stated that women CAHWs were just as good as men (CAHWs FGD) in the provision of animal healthcare.

Table 2. *Benefits of CAHWs deployment*

Key strengths	Who?
Livestock drugs are now available in the community	All
The number of livestock fatalities has declined	All
Knowledge and skills have increased (preventative and curative treatments)	All
Able to administer accurate drug dosages	All

Source (CAHW FGD, this study).

The perceptions of both key development actors and the CAHWs themselves were also validated during FGDs with LFFS students. Table 3 highlights the key services that CAHWs deliver to their communities.

Table 3. *Key services provided by CAHWs*

Key services of CAHWs	No. of LFFS
Treats sick animals	9
Teaches disease identification and sources of disease	5
Teaches how to manage livestock	4
Teaches how to deal with/report livestock problems	4
Teaches how to graze and mix herds	4
Sources and supplies drugs to treat animals	4
Migrates with livestock	4
Teaches how to feed livestock	2

Source: (LFFS FGD, this study)
N.B. Please note that the far right column indicates the number of LFFS FGD where this sentiment was expressed by the majority, if not all, of the participants.

It can be seen from Table 3 that CAHWs are perceived as providing the core services for which they were trained. All 9 LFFS FGDs clearly stated that CAHWs treat sick animals. Another important observation is that the CAHWs are also perceived as teachers who can teach pastoralists to identify diseases and their sources, and how to manage livestock (grazing, herd splitting and mixing, and supplementary feeding), and report livestock diseases.

Table 4 summarizes the key responses of LFFS groups to the prompt 'What services do CAHWs provide during times of drought?' It can be seen that, during times of drought, CAHWs act as key members of the pastoralist communities, assisting in the process of deliberating which coping strategy to deploy and in identifying or managing critical sources of livestock fodder during drought. This is in addition to their fundamental role of assisting with livestock problems. Four of the 9 LFFS FGDs also stated that the CAHWs migrated with the livestock during drought. CAHWs in the other 5 LFFS groups remained at the base-adakar during drought.

Table 4. *Key LFFS group perceptions of CAHWs during drought*

Key LFFS group perceptions of CAHWs during drought	No. of LFFS
Assists with coping strategy	5
Assists with key livestock problems	5
Assists with fodder production	5
Migrates with animals	4

Table 5 highlights key LFFS group perceptions of the personal strengths of their CAHWs. It can be seen that LFFS groups were supportive of their CAHWs. Whilst it was difficult to elicit answers to this question, as most participants tended to reiterate, the key services provided by the CAHWs, the two most popular responses, noted in 5 of the 9 FGDs, clearly stated that CAHWs do what the community expects them to do and are considered valued and credible members of the community. This sentiment is bolstered in 4 FGDs where it was stressed that CAHWs are always willing to help. All bar 1 of the CAHWs interviewed stated that they had full support of their communities. The CAHW without full support was one of the two failed CAHWs (CAHWs FGD).

Table 5. *Key LFFS group perceptions of CAHWs*

Key LFFS group perceptions of CAHWs	No. of LFFS
Does what expected and what he/she was taught	5
Is a key member of community and has a good relationship with community	5
Is always willing to help	4
Has a good knowledge of community	2
Doesn't push for payments	1

In an attempt to further elucidate community perceptions of CAHWs and to validate claims made by CAHWs about their own services, each LFFS was asked to list the key strengths of their CAHWs. Table 6 clearly demonstrates that CAHWs are generally perceived to be knowledgeable. Importantly, for this study, 5 out of the 9 FGDs felt that their CAHWs were good teachers. In an attempt to avoid confusion, each time a LFFS group mentioned that their CAHW was a good teacher, it was clearly explained that this question referred to the period before the LFFS began. Each group reiterated that their CAHW was a good teacher before they assumed the role as LFFS facilitator. In addition, 4 LFFS groups stated that their CAHWs was well respected, truthful and credible; a further 3 FGDs stated that they were also good leaders and were persuasive.

Table 6. *Key strengths of CAHWs*

Key strengths of CAHWs	No. of LFFS
Knowledgeable	6
Good teacher	5
Well respected, truthful and credible	4
Good handling of drugs	4
Good leadership and persuasive	3
Very active and hard working	3
High commitment and good heart	2
Enquiring mind	1
Good businessman	1
Good at reporting diseases	1
Trained outside community	1

In summary, evidence from FGDs with key development actors, LFFS groups and CAHWs themselves all support the premise that CAHWs play a key role in primary animal healthcare provision in Turkana. Evidence from the field also suggests that there is general community acceptance of CAHWs in their animal health role and that CAHWs are generally well respected members of pastoral communities. In addition, CAHWs are also accredited with providing guidance and leadership in a range of community activities, including providing input into drought coping/mitigation measures and general livestock production. More importantly, evidence from the LFFS FGDs also point to the key role of CAHWs as teachers and development catalysts. Table 7 highlights key weaknesses of CAHWs identified during the LFFS FGDs that will be referred to in subsequent subsections

Table 7. *Key weaknesses of CAHWs*

Key weaknesses of CAHWs	No. of LFFS
Sometimes lacks knowledge	4
No secondary school education	4
Doesn't have a sustainable income	4
CAHWs business suffers due to many distractions at home & with own animals	4
Mobility limited due to ill health or lack of food	3
Sometimes runs short of drugs	3
Sometimes lacks funds to purchase drugs	2
Inability to service such a large area	2
Insecurity impedes service	2
Lack of exposure outside Turkana District	1
Limited training	1
Difficulty in providing a service during migration	1
Sometimes misdiagnoses new diseases and occasionally kills livestock	1
Some people can't afford drugs	1
Some people don't present livestock	1
He's old with limited mobility and energy	1

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6.2.2 Training, experience and knowledge of CAHWs

As in many other studies of community-based animal healthcare, the lack of knowledge, technical competence and experience to deliver a quality animal health service was also raised during this study (see Table 7). Indeed, 4 out of 9 LFFS FGDs cited that their CAHWs sometimes lacked knowledge and 4 FGDs expressed concern that their CAHWs had no secondary school education. In addition, concerns were raised about the lack of exposure of the CAHWs to animal healthcare systems outside the district, limited training received by CAHWs and the fact that, sometimes, diseases were misdiagnosed, occasionally leading to livestock fatalities. Whilst not wishing to belittle the importance of the negative comments made with regard to CAHWs' knowledge, technical competence and experience, it was evident from the LFFS FGDs that, while deficits in these capabilities were viewed as important, they appeared to be far outweighed by the knowledge, technical competence, and experience that the CAHWs brought to the communities. When asked specifically about the ability of CAHWs to diagnose diseases, 6 out of 9 LFFS groups indicated that their CAHWs occasionally misdiagnosed new diseases. However, when the same question was raised in the FGD of key development actors, the DLMO and the VSF-Belgium representative also admitted to many professional veterinarians occasionally misdiagnosing new diseases, especially PPR. Whilst development actors representing Oxfam GB and Arid Lands stressed the continued need for in-depth training (Arid Lands and Oxfam), they did not suggest that CAHWs were unable to provide a quality animal health service; indeed, they implied the opposite.

Of the 11 interviewed as part of this study, all CAHWs had received training. Table 8 illustrates the time during which CAHWs received their initial training and the institution responsible for providing the training.

Table 8. *Initial training received by CAHWs*

Training by FGD strata	Date and training provider
2 Practicing CAHWs (non LFFS facilitator)	1998 SNV
2 Practicing CAHWs (non LFFS facilitator)	1999 VSF-B
2 Failed CAHWs	2000 VSF-B
1 CAHW (LFFS facilitator)	2000 VSF-B
2 CAHWs (LFFS facilitators)	2001 VSF-B
2 CAHWs (LFFS facilitators)	2003 VSF-B

Initial training comprised disease identification and the prevention and treatment of a range of diseases (including the correct use of drugs). CAHWs also commented on the selection criteria for CAHWs (i.e. non-drunkards, honest, competent, good leadership qualities and role model, respect and authority). CAHWs LFFS facilitators stated that the training was

relevant and that it enabled them to make a significant animal health impact. CAHWs suggested that the training was very relevant with lots of practical advice; dosage rates were given as an example. However, they also stated that some important topics were omitted, namely, training on abortion, surgery, AI and improved breeds. In addition to their initial training, all CAHWs present had also received refresher training (Table 9).

Table 9. *Refresher training received by CAHWs*

Strata of CAHWs	Refresher training			
2 CAHWs (non LFFS facilitators)	2000 × 2 SNV	2005 × 2 VSF-B	2006 VSF-B	2006 GoK
2 CAHWs (non LFFS facilitators)	2000 VSF-B	2005 × 2 VSF-B	2006 VSF-B	
1 failed CAHW	2000 VSF-B	3 subsequent trainings from VSF-B but can't remember specific dates		
1 female (LFFS facilitator)	2003 VSF-B	1 subsequent training from VSF-B but can't remember the specific date		
1 female (LFFS facilitator)	2002 VSF-B	2 subsequent trainings in 2005 by VSF-B		
1 failed CAHW	2002 VSF-B	7 subsequent trainings in 2003, 2004, 2005 by VSF-B	2006 × 2 ILRI, GoK	
1 CAHW (LFFS facilitator)	2002 VSF-B	7 subsequent trainings in 2003, 2004, 2005 by VSF-B	2006 × 2 ILRI, GoK	
1 CAHW (LFFS facilitator)	2000 × 2 VSF-B	14 subsequent trainings between 2000 and 2007 by VSF-B		
1 CAHW (LFFS facilitator)	7 subsequent trainings between 2000 and 2005 by VSF-B			

It can be seen from Table 9 that, each CAHW received a minimum of 2 subsequent trainings; indeed, one CAHW claims to have received 15 trainings. It should also be noted that, while CAHWs have received refresher training from 4 different training providers, the lion's share of training was provided by VSF-Belgium. All CAHWs who took part in the CAHWs FGD expressed that the refresher training that they received was of good quality and essential. Some participants went further by detailing the type of training that they had found particularly useful such as the identification and treatment of mange. Indeed, one participant admitted to mixing the symptoms of mange and anthrax, but that refresher training remedied this. The group also stated that training helped communities to fight/counteract diseases at a local level and helped with the detection of new diseases. Through the training, they have been introduced to specific drugs to treat specific problems. One CAHW stated that, 'before training, lots of livestock were lost and many diseases were prevalent. There was no knowledge on the ways to reduce mortality rates. Today, mortality rates have reduced. For example, before training, 100 out of a 100 kids could easily die. After training, most kids would survive'.

Whilst the whole group stated that formal education was no barrier to their role as CAHWs, they acknowledged the fact that the group as a whole had very low levels of formal education. As the discussion developed, several members of the group suggested initial training and even some of the refresher courses were too elementary. Indeed, the whole

group expressed the need for more training, especially more advanced training, better courses and more advanced courses particularly for those with higher levels of education.

6.2.3 Supervision of CAHWs

All bar three of the CAHWs had been, and still were being, supervised by VSF-Belgium's Community Animal Health Officer. The exceptions were the two CAHWs from Southern Turkana, who had historically been supervised by SNV, and then the Ministry of Agriculture, until recently when VSF-Belgium's had taken over the role. The remaining CAHW stated that he had no supervision but that elders often enquired about the status of livestock drugs. Two addition CAHWs also expressed that they received supervision from village elders. The CAHWs group also stated that the current supervision provided by VSF-Belgium focused on key areas of activity, including challenges, movement of drugs, assessment of livestock health and the need for vaccination. The whole group stated that they appreciated the help received from VSF-Belgium, particularly advice on drugs and livestock health. The CAHWs group clearly stated that the combination of quality training and supervision had increased their knowledge and skills and improved their performance with regard to preventative and curative animal health treatments.

6.2.4 Diagnostic capacity of CAHWs

CAHWs freely admitted that, when symptoms are similar, diseases are occasionally misdiagnosed. However, while concerns over correct disease diagnoses may have been implicit in the development actors' and LFFS groups' insistence on the need for regular and intense refresher training, very little evidence emerged to call into question the diagnostic capacity of CAHWs. Indeed, only one LFFS FGD identified the occasionally misdiagnosed new disease as a major weakness of their CAHW (see Table 7). Interestingly, 6 out of the 9 LFFS FGD groups (see Table 10) expressed the same concern when asked the specific question 'Do CAHWs always diagnose diseases correctly?' Conversely, Table 10 illustrates that all 9 LFFS FGD groups stated that their CAHWs were good at diagnosing diseases. This situation implies that, while CAHWs might occasionally misdiagnose diseases, occasional misdiagnosis is expected and almost acceptable. It must be noted, however, that the data are based on the perceived capacity of CAHWs to accurately diagnose livestock diseases etc., and not their actual capacity.

Table 10. *Disease diagnosis*

Disease diagnosis	No. of LFFS
Good diagnosis of diseases	9
Occasional misdiagnosis of new diseases and occasional livestock mortalities	6

6.2.5 Delivery of primary animal healthcare provision in remote and insecure areas

As with many previous studies, the capacity of CAHWs to provide animal healthcare services in remote and/or insecure areas was recognized as a major constraint. Indeed, this was one of the key topics raised during the FGD of key development actors. The ITDG representative strongly suggested that, amongst other challenges such as droughts and disease problems, insecurity and immobility both contributed to the inability of CAHWs to service large areas of Turkana. He also questioned whether CAHWs had sufficient knowledge and experience to deal with these challenges. The whole FGD group of key development actors added that they were aware of the difficulties faced by CAHWs in their quest to service vast and often insecure areas in the district, particularly for female CAHWs.

Concerns about the mobility of CAHWs were also expressed by LFFS groups. Table 7 contains numerous direct and indirect references to mobility concerns. In three LFFS FGDs, students identified the immobility of CAHWs due to ill health or lack of food as a key weakness of the CAHWs system. Students in another LFFS FGD highlighted that old age reduced their CAHW's mobility. Table 7 clearly indicates that immobility of CAHWs affects their overall performance as primary animal health providers. For example, 2 LFFS FGDs identified the fact that CAHWs were unable to service large areas of their community due to immobility as a key weakness. In another LFFS FGD, students identified the inability of their CAHW to migrate with livestock during drought as a key weakness. Other key factors that indirectly impede CAHWs mobility included insecurity concerns (raised in two LFFS FGDs) and distractions at home, such as tending to livestock, other businesses and/or children (identified in 4 separate LFFS FGDs).

In addition to immobility concerns expressed by key development actors and in LFFS FGDs, CAHWs themselves were also aware of, and willing to discuss, the difficulties faced in accessing and servicing vast, and often insecure, areas of the district.

All CAHWs in the group accessed their area by foot. Most CAHWs expressed concern over the significant distances that they were expected to travel in order to service livestock, both during and in between periods of drought. All stated that the scattered nature of settlements was a challenge! Indeed, one CAHW stated that he was expected to travel 90–100 km on foot (3 days and nights there and 3 days and nights back) in order to service his community's livestock. He added that the distances he was required to travel, and the concomitant time it took him, sometimes resulted in livestock dying before he could reach them. In addition, it was also stated that CAHWs often fall sick on the way to treat animals (CAHWs FGD). CAHWs also admitted to mobility associated problems closer to home. One noted that even within the 5 km radius of their home, there was nowhere to sleep or eat and that, sometimes,

nobody would feed them (CAHWs FGD). Immobility, due to ill health or lack of food, was corroborated in 3 LFFS FGDs (see Table 7).

Several suggestions were forthcoming from the CAHWs FGD on the subject of mobility. The whole group expressed an overwhelming need for transportation (either a bicycle or motorcycle). Indeed, several individuals reported that they had seen a bicycle with a small motor attached. They suggested that the engine could be engaged when peddling was too hard and, conversely, peddle power could be used when the going was easy or when they had no money for petrol or when petrol was physical not available. The CAHWs group also expressed the need for a tent when travelling around their area. They suggested that morale goes down when travelling. In addition, CAHWs requested assistance with human medicine in order to keep them healthy and enable them to travel (CAHWs FGD).

6.2.6 Failed or inadequate drug supplies

Whilst most of the CAHWs interviewed as part of this study suggested that they occasionally had problems sourcing drugs, they all stated unequivocally that drug supply was not a major problem. Indeed, the whole CAHWs FGD group stated that they were able to manage their drugs kits and funds skilfully.

As it can be seen from Table 11, all of the 9 LFFS FGD groups stated that their CAHW generally had the right drug; a further 7 groups added that drugs were affordable.

Table 11. *Drugs supply*

Drugs supply	No. of LFFS
Generally has the right drug	9
Drugs are affordable	7
Infrequent drug supply problems	6
Occasionally lacking the right drug (particularly for new diseases)	5

Whilst 6 of the 9 LFFS FGD groups stated that they had experienced infrequent drug supply problems, this was usually linked to a particular season when a specific drug was in very high demand or when pastoralists asked for a new drug, especially one used to treat a new disease (see Table 10). In addition, 3 of the 9 LFFS FGD groups stated that their CAHWs sometimes ran out of drugs and 2 LFFS FGD groups commented specifically about CAHWs not having the funds to restock drugs (see Table 7).

When questioned, 8 of the 11 CAHWs FGD participants stated that they had full kits, or thereabouts. However, some mentioned that they did not have enough drugs, that they needed a wider range of drugs, and that they needed somewhere local to store drugs. Many expressed that the initial kit was insufficiently stocked with drugs (CAHWs FGD).

When questioned about drug supply, CAHWs stated that they purchased drugs from a variety of sources, including Lodwar (through VSF-B and the Veterinary Office, GoK), Makutano, Kapenguria, Lokichar and Kitale. They openly stated that both the availability and price of drugs (including hidden costs such as transportation, food and accommodation) depended on how far away you were based from Lodwar. All CAHWs were adamant that they did not buy livestock drugs from quacks. All CAHWs stated that they trusted their principal drugs suppliers and rarely encountered problems. Interestingly, the whole group either believed that, or knew that, livestock drugs were cheaper in Kitale. For example, they implied that CAHWs in Southern Turkana, who were closer to Kitale, had a better supply of cheaper drugs compared to those operating in Central Turkana. All CAHWs questioned during this study supported the idea of creating a credit system for drug purchases; however, there was less support for the institutionalization of credit for livestock owners who were the terminal buyers of drugs (CAHWs FGD).

6.2.7 Disease surveillance

One could argue that, whilst implicitly questioning their own level of knowledge via their unequivocal calls for continued training, all CAHWs explicitly stated that being alert to new diseases (monitoring) and being first to identify diseases was one of their key strengths (CAHWs FGD). Indeed, 4 out of the 9 LFFS FGD groups stated that teaching pastoralists how to report disease problems was one of the key services provided by CAHWs (Table 3). One LFFS FGD group went further by stating that being good at reporting diseases was also a key strength of their CAHW (Table 6). Conversely, 6 LFFS FGD groups also stated that their CAHWs occasionally misdiagnose diseases (Table 10); indeed, 1 LFFS FGD group identified the misdiagnosis of livestock diseases as a key weakness of their CAHW (Table 7). Without further work, it is difficult with the current information to draw a strong conclusion at this time.

6.2.8 Financial fragility of CAHWs businesses

Financial instability was the principal concern that arose during the CAHWs FGD. Sources of financial instability came from: lack of market-integration of pastoralists; significant competition with quacks; and, low business profitability. Whilst all but one participant, a failed CAHW, in the CAHWs FGD group stated that they found it easy to save money from drug sales to replenish drugs, most CAHWs admitted that lack of market-integration of pastoralists was a key constraint to their businesses. They expressed concern that the low levels of livestock off-take in Turkana directly translated into low demand for livestock drugs. Many CAHWs stated that, as a result of the slow turn-over rate, some drugs expired before they were sold and many drugs are sold so slowly that the money received for them

ends up being spent on other things. One CAHW suggested that, on average, each CAHW sold 1 bottle of drug per week at a profit of Kenya shilling[1] (KES) 20 (CAHWs FGD). Even some LFFS groups recognized that there was a need for CAHWs to improve their cash flow problems and improve the viability of their animal health businesses (LFFS FGD). To further compound the problems associated with a limited cash market for livestock drugs, CAHWs also faced stiff competition from un-registered sellers of livestock drugs (quacks). Indeed, the whole CAHWs FGD group acknowledged that competition from quacks was a major problem, in part blaming them for their slow sales rate (CAHWs FGD). Quacks were accused of tricking pastoralists by peddling drugs with comparatively low levels of active ingredient at a cheaper price per volume than their CAHWs competitors. CAHWs stated that this had two detrimental effects; 1) it took away their legitimate business through unfair competition, and 2) tended to spoil the animal healthcare business, as pastoralists were often disappointed with the performance of the drugs that they had purchased from quacks. Indeed, the feelings towards quacks were so strong in the group that there was almost a unanimous call for quacks to be strictly regulated (CAHWs FGD).

Ultimately, in addition to low levels of market integration and stiff competition from unregulated quacks, all CAHWs stressed that the profits made from the sale of drugs, even when combined with payments for their roles in vaccination programs, were inadequate to sustain their animal health businesses. When asked if the CAHWs system is financially viable, all CAHWs answered no! The whole CAHWs FGD group expressed the need for greater financial incentives to do the job properly. They stated unequivocally that their profit margins of KES 5, 10, or 20 per bottle were too low (CAHWs FGD). Indeed, even VSF-Belgium's community animal health officer stated that the profit margins of between 10 and 20% were too low but quickly added that livestock owners could not afford to pay higher prices. He also admitted that transaction costs associated with the time taken to travel long distances in order to sell livestock drugs was not factored in when VSF-B originally set the prices that livestock owners were expected to pay and the concomitant profit margins of the CAHWs (CAHWs FGD). He added that CAHWs were almost obliged to source cheaper drugs in Kitale in order to increase their profit margins. During the FGD of key development actors, ITDG Practical Action recalled a case several years ago in which 20 CAHWs were trained and only 2 remained operational, a drop out rate of 90%. Ironically, most CAHWs admitted that, even though revenue is very low, the greatest share of their gross income still comes through selling drugs (CAHWs FGD). Lastly, whilst all CAHWs believed that the current system of animal healthcare in Turkana, namely, VSF-B, Ministry of Agriculture and CAHWs was good, it raises concerns over the resilience of the current animal health system if VSF-Belgium were to leave Turkana.

1. Kenya Shilling (KES). In December 2008, USD 1 = KES 79.05.

Providing a salary for CAHWs activities

CAHWs continually stressed that the services they provided (specifically treatment delivery and disease surveillance) were fundamental for the wellbeing of their communities and that, as such, they should receive 'something in return', namely a salary (CAHWs FGD; CAHWs LFFS FGD). They insisted that a regular salary for the provision of key CAHWs services was fundamental to the profitability of their animal health businesses.

Promoting multiple income sources

Aside from drug sales, all CAHWs admitted to owning and selling livestock in order to bolster their incomes (CAHWs FGD). Indeed, 8 out of the 11 CAHWs participants stated that they also had additional sources of income, other than livestock and livestock products, from trading goods such as dry food, maize flour, tobacco etc. Some also produced and sold cereals and vegetables. Whilst not explicitly stated, it is reasonable to assume that the income derived from these activities served to bolster the income derived from CAHWs' animal health businesses (see section on lack of market integration below).

Provision of business management training

Initially, business skills were not highlighted as a key need (CAHWs FGD). However, when asked the purposively leading question, 'Who would appreciate additional business skills support?' the whole group replied yes (CAHWs FGD). Given the earlier expressed preference for training, one would not have expected group participants to have refused additional training. However, the response did contain two important inferences. First, the whole group expressed that they were keen to receive business training. This is interesting because the whole group had just unanimously stated that they were all good businessmen/businesswomen. By admitting that they would appreciate more business training, they implicitly, at least in part, undermined what they had just stated. Second, it was notable because, unlike veterinary and livestock management training, business training has not traditionally been seen as a fundamental need for CAHWs. Whilst the group participants may have just been eager to receive more training, just for the sake of training, this response may also signify that CAHWs recognized their lack of key business management skills as a key limiting factor in both their animal health and other business activities. However, further investigation would be required to determine both the importance of training in general relative to other types of assistance and the prioritization of business training compared to training in other areas. This need for business training was also strongly echoed in the FGD of key development actors.

6.2.9 Lack of market orientation of pastoralists

Whilst freely expressing their frustration at the lack of disposable cash in the pastoralist economy, CAHWs were also able to share more positive news. For example, they insisted that many pastoralists are aware of the need to buy drugs in order to protect their livestock. All CAHWs suggested that the pastoralists they served appreciated the value of modern medicines. They also stated that the majority of pastoralists are willing and also able to purchase drugs. Indeed, all their pastoralist customers expected to pay for livestock drugs. When probed about their own terms of trade, 5 CAHWs explained that they worked purely on a 'cash on delivery' basis. However, it was also disclosed that a good number of pastoralists are often unable to pay and, at times, CAHWs are obliged to give credit or defer payments. Five CAHWs admitted providing drugs on credit, sometimes on a selective basis. A few CAHWs also admitted occasionally accepting payment-in-kind. However, this was not the preferred method of payment. One CAHWs FGD participant complained of getting a poor exchange rate for his drugs at certain times of the year. Another CAHW expressed concern about taking a goat around with him and that it died before he could sell it. Interestingly, the two CAHWs described above are also the two failed CAHWs in the group. Whilst possibly a coincidence and certainly statistically invalid, it is likely that the provision of animal health services on a COD or credit basis is more financially sustainable than working on a payment-in-kind basis or combination of the two. CAHWs suggested that drugs sales: 1) are highest during the wet season; 2) increase during Ministry of Agriculture and/or VSF-Belgium campaigns for mange or worm control; 3) are low at the end of vaccination programs; and 4) are buoyant when pastoralists sell livestock and have the money to buy drugs. In addition, CAHWs stated categorically that the demand for drugs is low when livestock prices are low. All participants stated that they believed that the development of livestock markets was a good idea. They believed that, if willing and able to sell more of their livestock, the benefits would be two-fold. First, if pastoralists recognized the role played by drugs in quality livestock production, the sale of livestock drugs would increase. Second, by selling livestock, pastoralists would have more disposable income and, therefore, be better able to afford livestock drugs (CAHWs FGD).

6.2.10 Credibility of CAHWs to teach/facilitate

Tables 3 and 6 contain a number of key transferable CAHWs qualities that could potentially be used in the role of LFFS facilitator. Of these qualities, it is likely that the fact that most CAHWs were already teaching the same or similar subjects in their communities is likely to be the most important. In addition, the fact that most CAHWs are widely trusted, respected and acknowledged as knowledgeable is also likely to assist them in their transition to LFFS facilitator.

6.2.11 Initial performance of LFFS

Benefits to community

Students divulged an impressive list of activities that they had engaged in as part of their respective LFFSs (Table 12). Not surprisingly, students compiled a long list of the types of things that they had learned. This list included similar topics to those covered by facilitators in their original role as a CAHW, such as disease identification and treatment (raised in 7 of the 9 LFFS) as well as new knowledge associated with enlightenment to their environment (raised in 7 of the 9 LFFS), particularly observations of animal health and condition, and livestock feed and water. In addition, students recalled that they had learned about the benefits of improved livestock management including fodder production, and had begun experimenting with new feeding techniques that promised quicker live weight gain and/or more milk production (see Table 12). CAHWs facilitators added that it was important that knowledge about livestock production, pasture management etc., flowed within the community. They stated that because of LFFS, skills were expected to reach more in the community via dissemination, particularly the youth (CAHWs LFFS FGD). In addition, LFFSs were also perceived as a good mechanism by which to hybridize new knowledge and skills originating from outside the community supplied by VSF-Belgium (and to some extent the facilitator), and existing knowledge in the community supplied by LFFS students.

Table 12. *LFFS activities*

LFFS activities	No. of LFFS
Enlightenment – alerted to their environment and the lives of their animals	7
Observed animal health	7
Learned about disease identification and treatment	7
Learned about fodder production	6
Learned that managed animals perform better than unmanaged	5
Observed condition in the morning and at evening	4
New knowledge is useful and applied	4
Changed livestock management practices	3
Observed feed, water and livestock	2
Learned about the quality & quantity of milk production	2
Learned about farming	2
Comparative study on the link between supplementary feed and milk production	1
Comparative study on the link between supplementary feed and meat production	1
Learned about new household roles	1

Table 13 illustrates the level of education attained by both LFFS students and their facilitators. It can be seen that the previous academic attainment of both students and facilitators is generally low with the exception of one facilitator who had been to college and trained as an Animal Health Technician. Whilst the academic attainment level is generally low in Turkana, it can be seen that the LFFS learning process is providing opportunities for often illiterate and

poorly educated pastoralists to enhance their human capital. Traditionally, aside from adult literacy courses, these opportunities have been absent in the district.

Table 13. *Inclusion of illiterate in LFFS activities*

LFFS name	No achieving level of education (F=Facilitator)			
	Primary	Secondary	Adult literacy	College
Nawoyatira	1 + F	0	8	0
Nawoyadome	F	0	0	0
Nakurio	2	0	0	0
Kaakimat	2	0	6	0
Lochoredome	4	0	2	0
Akuri	2	0	1	0
Naipa	2	0	3 + F	0
Kalemnyang	3	0	2	0
Turkwel	4	F	8	F

The provision of small capital grants was also perceived as one of the key community benefits of the LFFSs. In all 9 LFFS cases, the whole group was involved in developing the project proposal and was happy with the final project proposal submitted to their funding bodies (VSF-Belgium and ILRI). In 8 out of the 9 cases, the whole group was also involved in developing the project budget.

Table 14 highlights the expected private and communal benefits of being part of an LFFS. Overwhelmingly, and not surprisingly, students from all 9 LFFSs expected their knowledge would improve on key topics of importance to them, such as animal production and nutrition and disease treatment. In addition, it is interesting to note that students in 5 out of the 9 LFFS groups believed that the LFFS approach would assist in knowledge dissemination within the community (LFFS FGD). Improved knowledge dissemination was also foreseen by the facilitators themselves (CAHWs LFFS FGD).

Table 14. *Expected benefits of being part of a LFFS*

Expected benefits of being part of a LFFS	No. of LFFS
Improved knowledge (animal production, feeding, and disease treatment)	9
Knowledge dissemination	5
Confidence about what they know	2
Improved hygiene and presentation	1
New skills	1
Exposure visits	1
A source of water for farming	1
More income	1

Table 15 illustrates changes expected after 2 years. There are two particularly noticeable features. 1) In 8 of the 9 LFFSs, group members expected to possess more knowledge after two years and expected that this knowledge would have assisted them in improving their livelihoods. 2) In 4 out of the 9 LFFSs, group members expected that their livelihood support networks would be improved. During FGDs, it was apparent that most groups implicitly expected that their social capital would be significantly enhanced by being part of the group specifically when it came to accessing financial support and useful knowledge for community development activities (personal observations).

Table 15. *Changes expected after two years*

Changes expected after 2 years	No. of LFFS
More knowledge and better livelihoods	8
Improved livelihood support networks	4
Better livestock due to better knowledge	3
Better ability to survive	1

Benefits for CAHWs facilitators

The whole group of CAHWs/LFFS facilitators stated that drugs sales and financial returns had increased as a direct result of their role as LFFS facilitator (CAHWs LFFS FGD). CAHWs facilitators suggested that the LFFS had increased the knowledge of pastoralists and stimulated interest in their services, as both agro-pastoralists and pastoralists were now more critical regarding livestock health issues etc., and that they were much more focused on making progress with livestock production (CAHWs LFFS FGD). This outcome was also strongly supported by both Oxfam and VSF-Belgium. During the FGD of key development actors, one of the Oxfam representatives expressed that she believed that LFFSs were a good opportunity to improve the sustainability of CAHWs businesses. The VSF-Belgium representative supported this statement by adding that, as a result of being a facilitator, communities are now using CAHWs services to a greater extent.

Capacity of CAHWs to teach/facilitate

To date, all CAHWs facilitators have received initial training on LFFS facilitation during a training workshop in Lodwar. The topics covered include livestock production, group formation, pastures management, livestock feeding for milk productivity, watering, measurement of growth rates, drugs for livestock, agro-ecosystem assessment, how livestock progress and intensive care of livestock (CAHWs LFFS FGD). All were confident about their roles as LFFS facilitators and that learning in LFFS groups was reported as going well (CAHWs LFFS FGD). When asked about their lack of secondary school education, the whole group replied that ‘basic secondary school knowledge is not

relevant' (CAHWs LFFS FGD). However, all CAHWs facilitators expressed the need to 'build on what they already know'. They wanted the skills that would allow them to do what needs doing. The whole group stated that they appreciated the skills that they had already gained and that their knowledge had improved through the training and skills development already received. The group is scheduled for intensive training 4 times per year (CAHWs LFFS FGD).

From the LFFS students' perspective, whilst the field schools generally seemed to be progressing well, concerns were raised regarding the lack of knowledge possessed by the facilitators, specifically the lack of secondary school education. In all but one case, Turkwel, where the facilitator had been to college and trained as an AHA, the facilitators are only marginally more qualified than the students. In 5 out of the 9 LFFS, the facilitator has no formal qualifications (LFFS FGD). These concerns were also echoed by key development actors during their FGD. Whilst most development actors (especially Arid Lands and the DLMO) strongly supported the expansion of adult education, particularly if the curriculum covered topics that were very useful to pastoralists, they remained unconvinced of the capacity of CAHWs to successfully execute the role of LFFS facilitator specifically on the grounds of illiteracy and lack of training and knowledge. Both the ITDG and Oxfam representatives explicitly questioned the capacity of CAHWs to teach and facilitate

Weaknesses of LFFS approach

Key activities missing from project proposals

Whilst all LFFS groups, being grateful for the grant aid that they had received, also took full ownership of the types of support requested, there was still a feeling amongst the groups that there were key and crucial omissions in their grant proposals. Table 16 lists key missing activities highlighted by the LFFS FGD groups.

Table 16. *Key missing activities in project proposals*

Key missing activities in project proposals	No. of LFFS
A shallow well and/or water pump	5
Canal management	3
Chain-link fence	2
Tools and equipment for farming	2
Watering materials	1
Improved goat breeds (Gala)	1
Kiosks	1
Human drugs dispensary	1
Sale yard	1

The most important activities deemed to be missing from the proposals were all related to the absence of, or workable access to, water for small-scale crop irrigation. A total of 5 out of the 9 LFFS either mentioned the absence of a shallow well and or water pump as a serious omission. A further 3 LFFS mentioned the pressing need for canal maintenance. Indeed, several echoed Nathaniels (2005) expressing concerns about the viability of other key LFFS activities without reliable access to irrigation water. All LFFS groups listed what they believed to be significant limiting factors. These included a lack of water, cultivatable land, and other capital investments/infrastructure. The groups suggested that, if these limiting factors were addressed, the impact of LFFS could be enormous (CAHWs LFFS FGD)! In total, 5 out of the 9 LFFS groups interviewed stressed that the budget allocated to LFFS activities was insufficient.

Focus on agro-pastoralist context

Finally, the fact that LFFS focused on agro-pastoralists, rather than truly nomadic pastoralists, was highlighted as a cause for concern. All LFFS groups grew crops (either rain fed or irrigated). All LFFS groups grew sorghum, which was the principal crop type in all LFFS groups. In order of importance, LFFS groups grew maize (when enough water available), kunde (a leafy brassica), green grams, water melons and melenge. Some LFFS communities grew over 15 types of cereal and vegetable crops. Crops were commonly grown for subsistence purposes with surplus production sold in Lodwar. In addition to crop production, LFFS communities were also involved in the sale of livestock and skins (6 LFFS groups), weaving and sale of mats and baskets (4 LFFS groups), kiosk-based businesses (3 LFFS groups), production and sale of honey (3 LFFS groups), fishing in Lake Turkana and fish trade (2 LFFS groups), and the manufacturing and sale of charcoal (2 LFFS groups). Virtually all the activities listed above are sedentary and many are directly or indirectly linked to the River Turkwel and access to markets, namely, Lodwar.

7 Conclusion

The conclusion is divided into four distinct paragraphs, each one addressing a key objective of the report.

Whilst recognizably still in its infancy, the LFFS approach seems to offer significant potential to contribute towards VSF-Belgium's stated goal of 'improving the living conditions of vulnerable people in developing countries who depend directly or indirectly on livestock by improving livestock keeping'. This approach is compatible with VSF-Belgium's participatory community-based and capacity-building approaches to development. The discussion of whether or not LFFSs offer a cost-effective and efficient alternative to other community-level approaches to development is complex and beyond the scope of this assessment.

Whilst reasonably robust, the current provision of primary animal healthcare in Central and Southern Turkana remains vulnerable due to its high dependency on the potentially transitory support role played by VSF-Belgium. Despite this concern, there is significant recognition from key development actors, CAHWs and pastoralists that the current system of community animal healthcare works well. Indeed, there is an overwhelming understanding that this is possibly the only viable animal healthcare system that could work in Turkana. On the whole, CAHWs appear to be relatively well trained, supervised and monitored, and are highly valued members of their communities. CAHWs are generally well respected, trusted and credible individuals, with good community relations. CAHWs are also accredited with the ability to provide a wide range of crucial livestock-based services and are well recognized by pastoralist communities for their knowledge, experience, teaching skills and leadership. Relative immobility and business fragility are recognized as the two key weaknesses of CAHWs.

LFFS facilitation appears to offer potential to enhance the profitability of CAHWs animal health businesses and opens up the possibilities of new business opportunities associated with livelihood diversification. From the pastoralist perspective, whilst acutely aware of the low levels of human capital, pastoralists seem happy with the performance of their CAHW facilitators. Whilst the lack of formal schooling is acknowledged as a problem, CAHW facilitators are generally recognized as being knowledgeable on the topics of greatest concern to pastoralists. However, this is not the perception held by many key development actors in Turkana. Their position is that, whilst they recognize the potential catalytic role that LFFSs can play in the development of Turkana, they are explicit in their concerns over the ability/capacity of CAHWs to successfully fulfil the role of LFFS facilitator. Ultimately, however, as with the animal health situation in Turkana, perhaps CAHWs are the only feasible option for LFFS facilitation.

To date, the majority of LFFSs seem to be progressing well with anecdotal evidence of significant human capacity-building. Ultimately, however, key missing activities could potentially reduce the magnitude of success experienced by the pilot LFFS. Ultimately, the explicit or implicit sedentary agro-pastoralist focus of all 10 LFFSs is likely to have the most significant bearing on the likely success of VSF-Belgium's plan to scale up the initial 10 pilot sites to 50 LFFS sites. All LFFS pilot sites are currently focusing on agro-pastoralist and/or livelihood diversification activities which rely on either permanent or seasonally reliable access to water and good links to output markets. Whilst the current sites close to Lake Turkana and along the Turkwell and Kerio Rivers have good access to water resources and market outlets, the success of future LFFSs, if established in more remote areas with poor access to water and markets, cannot be so easily secured. Furthermore, the establishment of LFFS in more remote areas may also be hampered by even lower levels of human and social capital possessed by CAHWs. Whilst this would need to be tested, it could be assumed that, CAHWs operating in more remote/insecure areas of Turkana are likely to have received less training, supervision and monitoring support and will be expected to operate as LFFS facilitators in a much more challenging environment. It is therefore uncertain as to whether or not the relatively successful experiences of CAHWs facilitated LFFSs can be directly transferred to new LFFSs in more remote/insecure areas with limited access to water and output markets.

8 Recommendations

- In the context of current interventions aimed at catalysing pastoralists transition from subsistence to a market-based economy, development actors involved in the promotion of primary animal healthcare and/or LFFS in Turkana should examine options for the payment of salaries to CAHWs and LFFS facilitators for their public-goods services.
- In the context of high transaction costs associated with the provision of animal healthcare in remote/insecure areas, and the slow turn-over of drugs due to the lack of market orientation and competition from quacks, a review should be made of the amount of profit made by CAHWs on livestock drugs. This review should be underpinned by a study based on the 'willingness to pay' of pastoralists based on both current and future livestock and drug prices.
- In order to bolster incomes and improve overall business viability, all efforts should be made to promote multiple incomes sources for CAHWs. This could be achieved through the current LFFS's livelihood diversification activities or through other means.
- Business training should be provided for CAHW facilitators. This training should focus on basic business skills and the development of entrepreneurial skills and innovative capacity. In addition, due to the explicit focus on market-oriented livelihood diversification, LFFS members should also receive business training as part of their curriculum.
- Organizations involved in the promotion of primary animal healthcare should explore the possibility of assisting CAHWs with a means of transportation.
- Livestock marketing should continue to be promoted in the area. Increased livestock off-take would be likely to stimulate greater demand for livestock drugs and services through which both CAHWs and pastoralists would benefit.
- Financially viable livelihood diversification activities should continue to be supported in the area. If appropriate, livelihood diversification should also be promoted through the existing and expanded network of LFFS in Turkana.
- Marketing interventions should be undertaken to create stable profitable outlets for the outputs of diversification. If appropriate, this should also be promoted as part of the LFFS curriculum/activities.
- Assistance should be given to LFFS groups to source additional finance for key capital investments, which are deemed necessary to underpin key LFFS group activities.
- Assistance should be provided to LFFS groups to build human and social capital. This should include the development of a robust teaching curriculum, and the use of learning materials, that explicitly reflects current and expected future community needs. LFFS groups should be encouraged to become integral parts of both district and national knowledge and development networks. Emphasis should be placed on building the capacity of LFFS groups to clearly articulate the needs of their communities in these networks.

9 Future research needs

- It is imperative that a detailed base-line study is conducted for the 10 pilot LFFS sites. A further 10 sites, in reasonably close proximity of the pilot sites, should be randomly selected to act counterfactual controls. Without this study, any future robust analysis of the development progress made as a result of the introduction and development of LFFSs will be very difficult.
- It is recommended that a follow-up analysis of LFFS pilot sites and analysis of newly established LFFSs should take place in 2009.

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Appendix 1: Key informants present

Key informants present represented:

- Oxfam GB; ITDG Practical Action; VSF-Belgium; Arid Lands and District Livestock Marketing Officer

Key questions asked:

- What types of development interventions have you been involved in, specifically in the areas of animal health and adult education? Which ones were successful and which ones were unsuccessful?
- What are the strengths and weaknesses of primary animal health care in Turkana?
- How do you feel about the suitability of Community Animal Health Workers (CAHWs) to act as Livestock Farmer Field School Facilitators (LFFS)?

Appendix 2: Crib sheet for CAHWs FGD

Questions to be asked:

1. Did you receive training?
    a. How much?
    b. Was it valuable?
    c. How did it assist in your role as CAHW?

2. What about refresher training?
    a. When?
    b. By whom?
    c. Was it enough or appropriate?

3. Is there any additional essential support required
    a. Business management etc?

4. Who supervises/supervised you?
    a. What is monitored by your supervisor?
    b. Did the supervision support you in your role as CAHW?
    c. If so, how?

5. Did you require any additional support?

6. What are the key strengths of your role as CAHW?

7. What are the key services that you provide?

8. What are the key challenges faced by CAHWs?
    a. Financial viability?
    b. What leads to financial problems?

9. Do pastoralists buy a lot of drugs?
    a. Who and where?
    b. Are they willing and able to pay for them or do they expect them FOC?
    c. Do they see the value in modern medicines?

10. Is payment in cash or kind?
    a. If in kind, are there problems?
    b. Is it straight after treatment or deferred?

11. Can you always source the right drugs etc., at the right time, at the right price and from the right people?

a. Who are your suppliers?

b. Does this vary throughout the year or by the area or drug etc?

12. How long have you been a CAHW or how long was it before you dropped out and why?

13. Do you have another income source?
    a. If so, is it your principal source of income or only supplementary?

14. How could primary healthcare in remote areas be improved?
    a. Prompt
    b. Salary for CAHWs
    c. Refresher training
    d. Drug supply
    e. More drug stores
    f. Provision of transportation
    g. More women
    h. More AHAs and veterinaries
    i. Livelihood diversification
    j. Promotion of livestock marketing
    k. Credit facilities
    l. Increased community support etc?

15. Do you still have your full equipment kit?

16. Do you have a mobile phone?
    a. What is it used for in the provision of animal health services?

17. Is your business a good and profitable one?
    a. If so, what makes it profitable or unprofitable?

Appendix 3: Crib sheet for CAHWs/LFFS facilitator FGD

- What are your perceived benefits of being a LFFS facilitator?
- Do you foresee any disbenefits/problems of being a LFFS facilitator?
- Will being a facilitator affect your animal health business?
- What do you expect to see happen as a result of the LFFS over the next 1, 2 and 5 years?

Appendix 4: Crib sheet for LFFS students

a Assess characteristics of LFFS participants

Quick survey of background of participants

1. Gender
2. Age
3. Number and type(s) of livestock owned (as much as possible)
4. Other income sources
5. Education level etc.

b Assess LFFS participants' perceptions of the CAHW as a facilitator

1. Is facilitator a good CAHW?
   What are the main services that CAHWs provide?
2. What are the main contributions that CAHWs make to the community and pastoral life?
3. Was he/she always there when needed, particularly during drought?
4. What are his/her key strengths and weaknesses?
5. Did CAHWs facilitator or other provide a good service-discuss?
6. Did CAHWs always diagnose livestock diseases correctly?
7. Did he/she always have the right drug for your animals at the right price?
8. Is the facilitator computer literate?

c Assess performance of LFFS to date

1. What has been done so far and by whom?
2. Who produces local training materials?
3. Who produced the project proposals?

d. Was everybody involved in the development of the project proposals?

e. Is everyone happy with the project proposal?

f. Does it address all important areas of interest?

1. If not, why not?
2. Who was and who was not involved and why?
3. Who put together the budget?

g. Give details of training that facilitators have received?

h. Do facilitators feel confident to undertake their role as facilitator after training?

i. How did the production system survey and prioritization of constraints and resource needs carried out differ from that undertaken for development of CAHWs?

j. Assess the expected benefits of LFFS for pastoralist participants

k. What do you expect to gain from being part of the LFFS?

l. Prompt
    1. Skills
    2. Information
    3. Money
    4. More food
    5. Healthier livestock
    6. More productive livestock
    7. Greater voice

m. Other?
    1. What changes do you expect after years 1, 2 and 5?

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