LIVESTOCK-BASED LAND USE AND CHANGE IN THE BALE MOUNTAINS ECO-REGION: A COMPARATIVE STUDY BETWEEN 2007 AND 2016

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Gelatoma!

ACRONYMS

BERSMP	Bale Ecoregion Sustainable Management Project
BMNP	Bale Mountains National Park
FZS	Frankfurt Zoological Society
GMP	General management plan
IWMI	International Water Management Institute
Masl	meters above sea level
NGO	Non-governmental organisation
OFWE	Oromia Forest and Wildlife Enterprise
OWWSDE	Oromia Water Works Supervision Development Enterprise
PA	Peasant association
PHEEC	Population Health Environment Ethiopia Consortium
REDD	Reducing emissions from deforestation and forest degradation
SHARE	Support to the Horn of Africa Resilience (project)

EXECUTIVE SUMMARY

Introduction to the research

Livestock has been an integral part of the Bale landscape for centuries. Until recently the system was extensive allowing free mobility of a small human and livestock population (Hillman 1986; Solomon et al ND; Watson 2007). Over time, people have increasingly turned to crop farming despite the fact that in general the climate is not conducive for crop growing: it can take nine months for barley to grow and ripen. In the early 1970s the Bale Mountains National Par (BMNP) was established covering a major part of the ecoregion including areas that livestock keepers had traditionally used. A BMNP general management plan for 2007-2017 which included issues of resettlement and zonation has not been implemented. Only formally gazetted in 2014, access to the Park has been an ongoing issue of conflict between the Park authorities and local communities.

This research study was undertaken by ILRI for IWMI (International Water Management Institute), who is leading the research of the EU-funded Support to the Horn of Africa Resilience (SHARE) project until November 2017. SHARE works across the Bale EcoRegion with the aim of conserving biodiversity and ecosystem functions and services in the region, and improving the wellbeing of communities that depend on these functions and services. This research study is a contribution to this research presenting the status of current livestock land use and dynamics, and a comparative analysis of the situation today compared to 2007, when a similar study was undertaken. The study in 2007 was completed for the BERSMP (Bale EcoRegion Sustainable Management Programme) jointly implemented by the Ethiopian government (namely the Bale Forest Enterprise) and NGOs – FARM Africa and SOS Sahel Ethiopia. It is documented in the report: *Livestock and Livestock Systems in the Bale Mountains EcoRegion* (2008) by F. Flintan, W. Chibsa, D. Wako and A. Ridgewell.

The research for SHARE was undertaken in 2016, with fieldwork in two phases – one in April-May, and the second in November. The research took place in four woreda and nine kebele being: Fasil Angesso PA, Ashuta PA and Hilassa PA in Goba woreda; Erba PA and Berak PA in Delo Mena woreda; Sodu Welmal PA and Melka Arba PA in Harena Buluk woreda; and Gerambamo PA and Solana PA in Nensebo woreda. The same kebele and woreda were used in both the 2007 and 2016 study to provide for the comparative analysis.

Analysis and conclusions of the research

The Bale Mountains EcoRegion has a rich history of livestock production. Despite a number of challenges livestock remains the mainstay of the local economy in both highland and lowland areas. Following traditional practices, movements across the altitudes still exist particularly amongst communities in the southern parts of the region who take livestock up to forest areas in the dry season from drier lower parts. However, the movement of livestock today tends to be more opportunistic and in response to available resources rather than the more predictable *godantu* movements of the past. Figures show that there were around 726,020 heads of livestock in the afroalpine Park in 2015.

This study has shown that trends seen ten years ago including increasing cultivation of land particularly grazing areas, loss of local control of land to investors and the National Park (and more recently the Oromia Forest and Wildlife Enterprise), as well as intensification of livestock

production and diversification of livelihoods have all intensified. Some communities also complained about changing climate, reduced rainfall and higher temperatures.

According to the wealth ranking, most PA communities have seen an increase (if only slight) in overall wealth status. This was particularly the case in Fasil Angesso PA where livestock numbers had seemingly increased even though crop farming was also more prevalent. A likely reason for this is that the livestock keepers have been able to take their livestock up to the Sanetti Plateau where their most important (high quality) grazing is found. However if the BMNP is to carry out its threats of excluding livestock in this area, this will prevent such use and in the face of no alternatives it will likely have significantly negative impacts on the livelihoods of communities in Fasil Angesso as well as of other communities. Some PAs however are facing a more challenging situation including Hilassa PA in Goba woreda, where poverty levels appear to have increased over the decade. Seemingly this is a result of reduced productivity of land for crop farming and a lack of alternative grazing for livestock, contributing to the poor livestock productivity levels seen.

At the same time communities are struggling to maintain control of their lives (including food and land security), to access inputs and extension services to improve their livestock production and deal with diseases and new threats such as invasive species, and to maintain access to the resources important for their livelihood systems. Conflicts between land users are increasing, including between communities that in the past willingly shared land and resources including grazing. To a degree this has seemingly been aggravated by well-intentioned interventions by NGOs. In those communities that are better-off and are closer to towns (such as those in Goba woreda), school attendance has increased in importance and occurrence.

In Berak PA, a community rich in grazing areas and traditionally a host for many neighbouring livestock in the wet seasons, has seen large sections of its land taken out of community control and use, and provided to investors for growing of crops and such as biofuels. This was a process started in the early 2000s, and during the study in 2007, community members were already complaining about the situation. As the trend continued and with the increasing loss of grazing lands, community members have started growing more crops and are beginning to enclose and increase regulations on the remaining grazing areas. Today Berak's livestock keepers face conflicts with the investors (secretly releasing their livestock on the investors' land in protest). In addition Berak has started implementing PRM (participatory rangeland management) (with support from NGOs) including new bylaws and such as rotational grazing practices. However this has not been easily accepted by communities who have traditionally visited Berak for grazing, and are now faced with the new rules and regulations. In order to avoid conflicts between the two parties it is necessary to facilitate discussions between them in order to come to a mutually-beneficial agreement about sharing of resources, and plan this across the wider Bale landscape including both communites, their neighbours and other stakeholders.

Though perhaps not so intense, other communities/PAs are facing similar challenges. Excluding Nensebo woreda, all communities complained that they have lost important grazing areas to crop production. Not only this, but crop growing often blocks migration routes meaning that it takes longer to move to those grazing areas still available and/or water sources. Community members are not adverse to crop growing, and indeed most respondents (apart from the very poorest) do grow some crops if only for subsistence. Local government has encouraged this with the provision of inputs, tools and extension services as well as an increase in markets and prices of agricultural products.

However, though community members see the benefit of growing crops as well as livestock, they would like to see more extension services and support from government for livestock (and not only for crops). This was a complaint raised in the study in 2007. However, though extension (including veterinary) services do have appeared to improved in some areas such as in Nensebo woreda (where livestock disease appears to have significantly reduced) in others, particularly those that are more isolated such as Harena Buluk and Delo Mena woredas, and even in Hilassa PA in Goba, livestock extension services are close to non-existent or demonstrably lacking. When asked, kebele government administration offices in the majority of PAs stated that they do have one land use administration expert, one livestock expert, and one agronomist – however as suggested by the communities the capacity of these experts to address all needs across the woreda is inadequate. Community members blamed the lack of support from higher levels of government as the reason why a disproportionate amoung of budget and resources are provided for livestock production systems.

Additionally in all PAs where there were state or investor crop-growing farms, community members complained that the farms had introduced new plants (invasive species) into the area that was degrading grazing areas, and even poisoning livestock. Community members also mentioned a plant called *gonde* that grows in marshy areas and close to rivers, which causes sickness and death to cattle if they eat it. These new invasive species are increasing in their prevalence and need urgent attention.

Aross the zones, woreda and PAs that participated in this study livestock numbers have grown, and quite substantially in some cases, according to government figures. In Bale zone (as shown in Appendix 1) cattle numbers have increased from 2,290,163 in 2000 to 2,825,215 in 2015. Shoats have increased from 653,676 in 2000 to 1,934,461 in 2015. Equines have increased from 234,379 in 2000 to 519,887 in 2015. And camels have increased from 67,956 in 2000 to 226,616 in 2015.

In Goba woreda figures state that by 2015, total livestock numbers were 190, 726 heads, made up of 95,715 cattle, 74,04 shoats (mainly sheep), and 20,957 equines, around 25% increase from 2007. Though the number of cattle has increased only slightly, it is the number of shoats that have increased most significantly - by a factor of six between 2000 and 2007, and again doubling between 2007 and 2015. If a comparison is made between 2000 and 2015 then shoats would have increased by a factor of 11.

Prior to 2007 Harena Buluk and Delo Mena were one woreda - Mena Angetu woreda. Total livestock figures of Harena Buluk and Delo Mena in 2015 were 723,269 heads of livestock made up of: 479,601 cattle, 160,731 shoats, 37,515 equines, 45,422 camels. This is a nearly 3-fold increase from 2007, and a 3.65-fold increase from 2000 with increases across all livestock types including cattle. In Harena Buluk alone livestock numbers in 2007 totaled 95,319 heads, made up of 59,669 cattle, 23,673 shoats, 7,863 equines, and 4,114 camels. In 2015 these had increased to 232,377 heads of livestock made up of: 156,975 cattle, 54,917 shoats, 19,735 equines, and 750 camels giving a 2.5-fold increase on total numbers and with cattle increasing nearly 3-fold, shoats and equines over 2-fold, and camels reducing significantly (the reason for which is not clear). Most significant is the increase in cattle.

In Delo Mena alone, total numbers of livestock heads in 2007 was 154,409: this was made up of 102,324 cattle, 26,097 shoats, 6,412 equines and 19,576 camels. In 2015 this had increased to a total number of 490,892 heads, made up of 322,626 cattle, 105,814 shoats, 17,780 equines and

44,672 camels. This is a more than 3-fold increase (i.e. in eight years) with increases across all livestock types, including a more than 4-fold increase in shoats (mainly goats). This is surprising considering the increased pressures on grazing, and the conversion of much land to crop farming.

Livestock populations of Nensebo woreda in 2000 stood at 100,617 cattle; 17,252 shoats; and 6,210 equines, which equals 76,194 TLU or 124,079 heads of livestock. No 2007 data was obtained. The total number in 2015 however was 251,845 heads, made up of 156,353 cattle, 70,777 shoats, and 24,715 equines. This shows a doubling of livestock numbers over the 15 years, with a lesser increase in cattle numbers (only 50%), but a 4-fold increase in the number of shoats and equines. This is not surprising given the more sedentarised living in the woreda with a large amount of cattle kept in more intensified zero grazing systems, whereas shoats in particular are able to browse on remaining resources more easily.

Where land pressures and land use changes totally prevent livestock movement, this has led to the replacement of extensive grazing with zero-grazing systems (Solana PA and Ashuta PA), supplementation of grazing with cut-and-carry of grasses (Gerambamo) and the increased feeding of fodder and forage including crop residues, plants, enset and other. In some PAs including those in Nensebo woreda (Gerambamo and Solana) the fattening of livestock in enclosures now makes an important contribution to local livelihoods. The opportunity to do this has been increased by improved infrastructure in the area. However generally, most communities say that the fodder and forage are poor substitutes for grazing/grass and is reflected in lower productivity of livestock in some cases. The feeding of feed concentrates to livestock was hardly mentioned. In addition a limited introduction of 'improved' breeds has been seen over the last decade, though these are mainly dairy animals. Though the marketing of livestock has increased in nearly all cases those interviewed said they only sell livestock when there is a specific need e.g. to pay medical fees, school fees, or for a cultural event such as a funeral or wedding.

In general water access for livestock and human consumption is not a problem, and though some community members mentioned it took longer to take livestock to water points in areas where there is increased farming, in general most communities have access to water all year round (excluding unusually dry months). In addition the use of *hora* (mineral springs) and *haya* (mineral licks) is still common providing important health-giving minerals for the livestock. Though some *haya* have been lost to agriculture since 2007, it would seem that the majority of both *haya* and *hora* are still in use. Where communities do not have access to these natural salt sources and/or where livestock do not move (i.e. in Nensebo), mineral supplements are purchased. Said to be soda-based minerals from the Rift Valley Lakes called *bajji*, these are mixed with soil and fed to the livestock. Where veterinary services are available they appear to be well-used by community members, including vaccination. There appeared to be little introduction of improved breeds in the more highland areas, though they were mentioned in Goba and Nensebo (i.e. where more intensification of livestock production has taken place).

The lack of security to land and resources is an underlying cause of many of the problems that the community face. Government promotes individual land holding over communal, reflected in the strong drive in the area to allocate and certify plots of farming land to individuals and/or households. However communal lands, including those remaining grazing areas that many livestock keepers depend upon, remain unregistered and uncertified. Additionally, because livestock are moved to different areas for wet and dry season grazing the land from which they

have come is left 'vacant' for part of the year. Local government argues that this land could be put to 'better' productive use, and with no certified owner the government can easily allocate that land to other users such as investors or to landless youth. In some PAs e.g. Ashuta in Goba, the government is encouraging the community to *pay* for grazing; and in Solana and Gerambamo the leasing of grazing to other uses is a common occurrence. Further, the renting of draught power (oxen) is common in the crop farming areas.

The introduction of PRM (participatory rangeland management) in Berak PA by FARM Africa and SOS Sahel, has to a degree legitimized local land use including grazing and contributed to securing the land for the community, following a management plan and regulating bylaws, with a resource user agreement established between the local PA government and the designated cooperative(s). However as described above, the increased formalisation and control of access to these grazing areas (traditionally used by many neighbouring communities in the wet season) is now leading to conflicts between the Berak PA and the visiting secondary users. This situation demands the introduction of a more watershed or landscape planning approach that considers land and resource use across the whole Bale region, the implications of one intervention in one place on others in the region, and how best negative impacts of such an intervention can be prevented and/or mitigated.

Forest encroachment from farming was an issue of significant importance for many communities and particularly those that use the forest areas for grazing. This had not only lead to problems in accessing resources as well as a degradation of those resources because higher numbers of livestock are using less available, but also it has lead to conflicts between herders and crop farmers. Though the Oromia Forest and Wildlife Enterprise state that they support community-based/participatory forest management, the complaints of the community suggest otherwise and the OFWE would rather appear to be seeking to restrict/prevent the access of the communities rather than working with them to manage the forest areas. This seems to be a lost opportunity for a win-win situation where the OFWE would benefit from the community helping to manage the forest, and the community benefiting from keeping access to it.

However, the most important issue for many of the communities, particularly those bordering BMNP (including Erba PA-Delo Mena, and Fasil Angesso-Goba), is the recent designation of the Park and plans to demarcate the boundaries and exclude herders and their livestock from grazing inside. This was the most heated issue discussed, with community members highly aggravated, increasingly resentful, and seemingly willing to take all measures to maintain access. They said that this situation should never have arisen as in the past they have protected the Park and such as the Ethiopian Wolf, and are still willing to do so. Yet they have been completely left out of decision-making processes about the Park, and now these recent moves to exclude them and their livestock reflect a complete lack of regard for them, their livelihoods and their willingness to participate in the management and protection of the Park. They believe that if the Park was to work with them then compromises and solutions could be found that will benefit all. It would seem helpful therefore if Park authorities and supporting NGOs such as Frankfurt Zoological Society (FZS) improve opportunities for the participation of willing communities in Park decision-making and management, and compromises/agreements are established allowing limited and regulated use of parts of the Park (e.g. priority grazing areas) and its resources.

An important future development for the region would be land use planning at different levels. Currently the Oromia Water Works Supervision Development Enterprise (OWWSDE) is

producing a land use plan for the Bale zone. The document was not finalized in time for review in this study, but it will likely have strong implications for future land use in the area, prioritizing different land uses in different areas. Additionally there are opportunities for lower levels of land use planning through the government structures e.g. at woreda level, as well as at community level – and already being carried out in Berak PA supported by the PRM process. A key component of such land use planning should be considering different scenarios e.g. with or without grazing in the National Park. In addition a more indepth and quantitiative as well as qualitiative study of livestock numbers in the Bale Mountains Eco-Region (including a detailed livesetock population census) is required.

A major issue is what is the 'carrying capacity' of the land – however if this is to be properly calculated then it needs to be done on a scale of the whole landscape so that the different parts of the landscape and their relevance for livestock production at different times of the year and other factors are taken into account, together with movement between these. Such movement is important for ensuring cattle in particular remain healthy and productive in the challenging environment across the different altitudes and climates, so preserving the more beneficial components of the extensive livestock production that has a comparative advantage in the region: both in terms of production and in terms of conservation, grasslands if well-managed are more beneficial to the environment than crops. If such land use planning processes are implemented in a participatory, inclusive way involving all land users, with possibilities for some consensus about future land use, then these processes could contribute to the resolution of many of the problems that were encountered in this study.

1. INTRODUCTION

1.1 History of livestock land use in the Bale EcoRegion

Livestock has been an integral part of the Bale landscape for centuries and until recently the system was extensive allowing free mobility of a small human and livestock population (Hillman 1986; Solomon et al ND; Watson 2007). In the 1800s a rinderpest outbreak (particularly in the Rira area) killed off tens of thousands of the cattle. During the imperial era grazing lands were effectively declared as belonging to the state (*ye mengist merit*). The livestock pastures were seen as a no-man's lands alienated for other purposes.

In an attempt to generate taxable resources systematic land measurement (*qalad*) began in the 1950s, privatizing what had been commonly-held resources and marginalizing those with less means to influence the land registration process (Mindaye 2005). This was a major contributing factor to the first Bale Uprising of 1963 to 1970. The Uprising also contributed to a reducing livestock population in the region as animals were stolen by combatants and even bombed from the air (Ayele 1975). During this time landlords tended to control access to grazing, particularly where the area was also suitable for agriculture. The system at the time put 'good' agricultural land under a private landlord and charged the users for any access.

The coming of the Dergue following the 1974 Revolution marked the state's grip over productive resources facilitating sendentarization (Helland 2006). The landlord system described above was abolished and land was opened up for all. However, the establishment of large state farms in the Goba area left little room for livestock keepers who were increasingly pushed to higher altitudes including to the area which would become the Bale Mountains National Park (BMNP) (see below). This disturbed the traditional livestock movements – locally called *godantu*.

Box 1.1 The traditional *godantu* livestock system

A system of seasonal movements known as *godantu* was the predominant method of livestock management. Livestock were split into a *fora* herd of dry cows, bulls as well as camels (where kept) and a *warra* herd of milking cows, as continues to be the practice in the Borana rangelands (Ayele 1976). This often relied upon reciprocal kinship relations known as *godanna* (B & M Consultants 2004). The *fora* herd was trekked to distant pastures and water points by the household head and the boys of the household, while the *warra* herd remained behind and was tended by the women of the household (Ayele 1976).

These livestock movements appear to have been dictated by the lack of water and grazing in low lying areas (*gammojji*) and also the presence of livestock diseases that proliferate in the dry seasons (Ayele 1976). Therefore while the lower altitudes provided grazing during the wet season, during the dry season livestock were trekked to the higher altitudes (*badda* and *badda dare*) and in particular to high altitude forests. Forests provided a rich source of fodder, browse and also shade (Girma 2005). The shift to growing of crops in some of the mid-altitude areas has shifted the movements of livestock somewhat, with livestock being pushed out and up from these areas to such as the Sanetti Plateau during wetter months. As confirmed by the BMNP (2006): "Under the *godantu* system, peak livestock numbefs occur in the Afroalpine in the wetter months, from April to August, when livestock are moved from lower pastures where agricultural crops are being grown. In the Harenna Forest, influxes of pastoralists from the surrounding lowland areas are reported for 3-4 months (December-March) in the dry season."

Indeed, in 2006 it was stated that peak livestock numbers occur in the Afroalpine in the wetter months, from April to August, when livestock are moved from lower pastures where agricultural crops are being grown. In the Harenna forest, influxes of pastoralists from the surrounding lowland areas are reported for 3-4 months (December-March) in the dry season (BMNP, 2006:58).

As livestock numbers decreased, the local population increasingly turned to agriculture as an alternative livelihoods system. This placed further pressure on pastoral resources, increasingly limiting movement. This is the despite the fact that in general the climate is not conducive for crop growing: it can take nine months for barley to grow and ripen. As a result of increasing pressure on resources, disputes over communally held grazing lands (*lafa dheeda*) became common occurrences (Mamo 2005). Disputes tend to be settled through either formal or informal means: formally through the woreda administration and informally by the council of elders (*jaarsa biyyaa)* or ritual experts known as *wayyuu* (ibid). In either case, farmers are given greater opportunity than livestock owners to demonstrate ownership to their land with the latter finding it difficult to prove use, let alone 'ownership'. Alongside the expansion of smallholder agriculture, mechanized large-scale agriculture has increased, though limited to places of 3000 masl or below (Guilio 2003; Hillman 1986). This has further compelled livestock producers to shift their migration routes into the higher altitude regions (WAAS 2005).

From the late-1970s attempts were made to settle the local population and limit movement of people and livestock across the area. Most recently (circa 2000), this included the resettlement of several hundred families from Haraghe, mainly in Delo Mena woreda. Mainly agriculturalists, they sped up the converstion of grazing land to crop agriculture. Conflicts between the settlers and local livestock herders occured sporadically.

Despite the shift to more settled agricultural lifestyles livestock continued to be the mainstay of the economy. Indeed, livestock particularly cattle were considered more than an economic asset and treated with respect. For example on New Year the local people not only celebrated themselves by eating a big meal, but they also took cattle to the best grass available so they too could eat their fill (personal communication, 2000).

More recently Watson (2007) found that agriculture was the primary work activity for 84% of households in Mena, Goba and Dinsho woreda. Livestock was regarded as the secondary livelihood activity for 64 per cent of households. However, she also found that 99 per cent of households kept some livestock "…for both non-consumable (transport, ploughing and reproduction), and consumable purposes (milk, skins, selling and eating). No respondents reported social status, savings or insurance, as a reason to keep livestock" (ibid: 38).

In some woreda it has been reported that cattle are kept primarily for draught power and secondly for milk production. Further, shoats are seen as being 'highly significant' to food security and self-sufficiency and are kept within the mixed crop-livestock farming system. In these areas animal husbandry and crop farming can be highly integrated. Draught power is relied upon for cultivation while agricultural inputs are often financed from livestock sales (Solomon et al 2005).

It is said that more sedentary lifestyles brought about by the expansion of crop farming has led to the need for the supplementation of livestock feed with fodder and in particular crop

residues. Residues from cereals (wheat and barley), pulses (field pea and faba bean), linseed as well as maize are available in some locations (Solomon et al 2005). In 2005 some *woreda* crop residues represented the main source of animal feed during the dry season (81.4 per cent of respondents in Dinsho and Sinana) (ibid). During the long dry season barley straw and maize stock were the main sources of fodder with priority given to oxen as ploughing was also undertaken at this time (Agarfa, Dinsho, Gasera and Sinana) (Solomon et al 2005). It was also reported that improved forage crops including vetch and Rhodes grass were introduced into Gassera woreda although they had restricted use (Bekele et al 1997). Although its use remained limited in many areas crop residues represented the major external input to the livestock sector (81 per cent of informants) (Watson 2007). However, this was reported to be highly dependent on location, altitude and herd composition with some areas yet to introduce the practice. For example it was said that fodder remained insignificant or not used at all in other woreda (Berebere, Delo Mena, Harena Buluk and Meda Welabu) (Bekele 2005).

A review of livestock numbers across the Bale zone (see Appendix 1) shows a reduction between 2000 and 2007, but a doubling between 2007 and 2015 from 2,611,618 (number of cattle, shoats, equines and camels) to 5,506,179 in 2015. Though there may be some issues in data collection and reporting here, it is clear that there has been a substantial increase and that though trends of crop agriculture increase have continued across the zone livestock still dominates.

1.2 Bale Mountains National Park

The Bale Mountains National Park (BMNP) was established in 1970 encompassing an area of 2400 km sq. Those communities already living in the area were not involved in this decision despite recognition of their mainly negative impact on the land. Leslie Brown a naturalist (who played a role in the establishment of the Park) visited the area in the early 1960s noting that:

> *The Galla[6]1 are a largely pastoral people, unlike the Amhara, who are cultivators. No pastoralist is quite as destructive as a cultivator, so this noble plain retained much of its pristine beauty* (Brown 1965: 100).

Describing the area around Adaba and Dadola:

> *This whole country, on a fine day, would have been like the proverbial Garden of Eden* (ibid:120)*…..They were an almost perfect example of a community of primitive people whom it seems better not to disturb or try to change, because they have enough for their own needs and a little more and are not, in the satisfaction of these needs, doing any real harm to their habitat. Here no one had yet learned the destructive use of the plough on steep slopes. They had enough land to enable them to pursue the more leisured and gentlemanly pastoral way of life without starving and the forests were open enough and provided with rich enough herbage to let them live without having to hack down the cover….Although it was not my responsibility, I could not help cogitating on ways and means of preventing the destruction of the forest cover which will, with increase in population, be inevitable some day unless this favourable situation is stabilized while the chance exists* (ibid: 121).

[6] *Galla* is a term used for the Oromo people in the past, now considered derogatory.

He continued:

> *We saw very few human beings upon these mountains. Horsemen were sometimes seen crossing trails, but there were no herds of stock. We gathered that herds only came up here when the country was nearly dry; it was never quite dry. There was only one month in the year when the heath would burn, and then not every year. Heath fires were generally started by people along trails and, given the right conditions, they would go on and on till stopped by some obstacle, such as another track, a river valley, or a continuous sill of rock* (ibid:134).

During the Dergue state authority over the Park was at its strongest resulting in the forced removal of settlements and the effective colonisation of the mountain landscape. As feelings towards the Park were not favourable, *"the local people destroyed all the outposts during government changeover in 1991…*[a]*fter demolishing the outpost, Tamsa'a area was converted into farmland by the local people"* (B & M Consultants 2004: 28). Many people returned to the Park following the fall of the Dergue in 1991 and the disintegration of controls, although the eviction of some communities was attempted again in 1999 (Flintan 2000; Malcolm & Evangelista 2005). Over the next decade and a half management of the Park has lacked consistency though there have been several further attempts to evict villages, though not necessarily well-enforced resulting in a return of many villagers once the controls have weakened. In addition a number of different development projects have been undertaken, mainly in the surrounding areas in anticipation of being able to 'pull' community members out of the Park to access better services and livelihood opportunities.

In 2007, when the first research was undertaken, although the Park had still not been formally gazetted attempts were being made to delineate the boundary. This reflected the launch of the most recent genral management plan (GMP) for the Park, produced with the support of Frankfurt Zoological Society (FZS).[7] This Plan supported the sustainable use of Park resources as long as it did not affect the primary management objectives of conservation. It was anticipated that this could be achieved by a 'zoning' of the Park into different use zones, which would allow grazing in an a natural resource management zone. Settlement of local communities from inside the core protection zone to outside the Park boundaries was indicated as an intervention. The conservation of Exceptional Resource Values of the Park was given precedence over any other kind of use (BMNP 2006).

Livestock enter the Park for grazing, browse (in wooded areas) and to access the mineral springs or *hora* (see Box 1.2). In addition there is a major transport route (now a tarmaced road) through the Park running over the Sanetti Plateau from Goba through Rira village to Delo Mena. The increasing settlements and increasing numbers of livestock in the Park are of concern to the Park, government and conservation organisations for a number of reasons including:

i) Disturbance of the hydrological cycle and water sources in the highlands, upon which hundreds of thousands of people rely upon including in the lower parts of the watershed.
ii) Erosive impacts of livestock hooves, grazing and browse on vegetation cover.

[7] Though there have been a number of management plans produced in the Park including the first in 1974 by the then Park Warden Chris Hillman, updated in 1986, a second in the early 2000s developed by the World Widlife Fund though never finalized and the current General Management Plan 2007-2017 (compiled and edited byt the Frankfurt Zoological Society).

iii) Negative impact on tourists who do not wish to see livestock in the Park disturbing 'natural' views.
iv) Disturbance of, competition for grazing with, and spread of disease to the Mountain Nyala and Ethiopian Wolf (distemper and rabies).

Said to be of particular vulnerability is the ericaceous belt of the mountain area (Yoseph Assefa et al undated).[8]

Box 1.2 Mineral springs *hora* and mineral lick *haya*

Mineral springs are found mainly in the northern part of the BMNP (used mainly during the drier months) and around Dinsho Town (used all year round). Hillman (1986) identifies nine *hora* but sees them largely as an excuse used by herders to graze within the BMNP noting also that, "[i]*t is a small step for temporary-use housing and caves to become permanent use."* Figure 1.1 shows the same author's interpretation of livestock routes to *hora*. However in general the importance of the mineral springs for livestock (particularly cattle) nutrition/health is generally recognised through provision of sodium, potassium, calcium, manganese, and zinc (Kemp McCarthy 1990; BMNP 2006). A study in 1990 found that the *hora* within the BMNP were not regulated while those outside the boundary were administered by the local PA, with elders controlling access to the springs and keeping them relatively clean. Up to 2005 the Park had not restricted access to the *hora*.

Kemp McCarthy (1990) pieced together information on routes to the mineral springs:

The traditional access routes to the horas are along river valleys. No herdsmen were recorded travelling from the south and south-east of the Park to the high level horas at Wasama and Worgona, although well worn paths exist from this area, crossing the Sanetti Plateau (Hillman 1986). Paths to Horas Worgona, Salitti and Cave Hora follow the Danka River from the south-east. The Web and Sodota River valleys provide the main route to Hora Wasama from the north, whilst the Keyrensa River links the Haricho region of the Park with the area around Wasama. The Garemba and Rira Rivers provide a passage-way to Wasama from the south. The Sodata River links Hora Kotera with the south-east and the Web River provides a passage from the north. Horas Soba and Tayanta are both located just south of the main road, providing the most obvious routeway to these springs from the north-east and south-west" (ibid: 48). (See Figure 1.2)

Where mineral springs are not available (i.e. in lower altitude areas) there tend to be mineral licks instead. Not only are the animals taken to feed directly from the soil, but also the soil is mixed with water and given to the animals. Livestock keepers believe that the minerals improve the health of the livestock, reflected in stronger animals that for example produce more milk.

[8] More information can be found in the report of the research undertaken in 2007 (Flintan et al 2008).

Figure 1.1 Livestock routes to mineral springs and licks, water and grazing in Bale Mountains National Park in the 1980s (Hillman 1986)

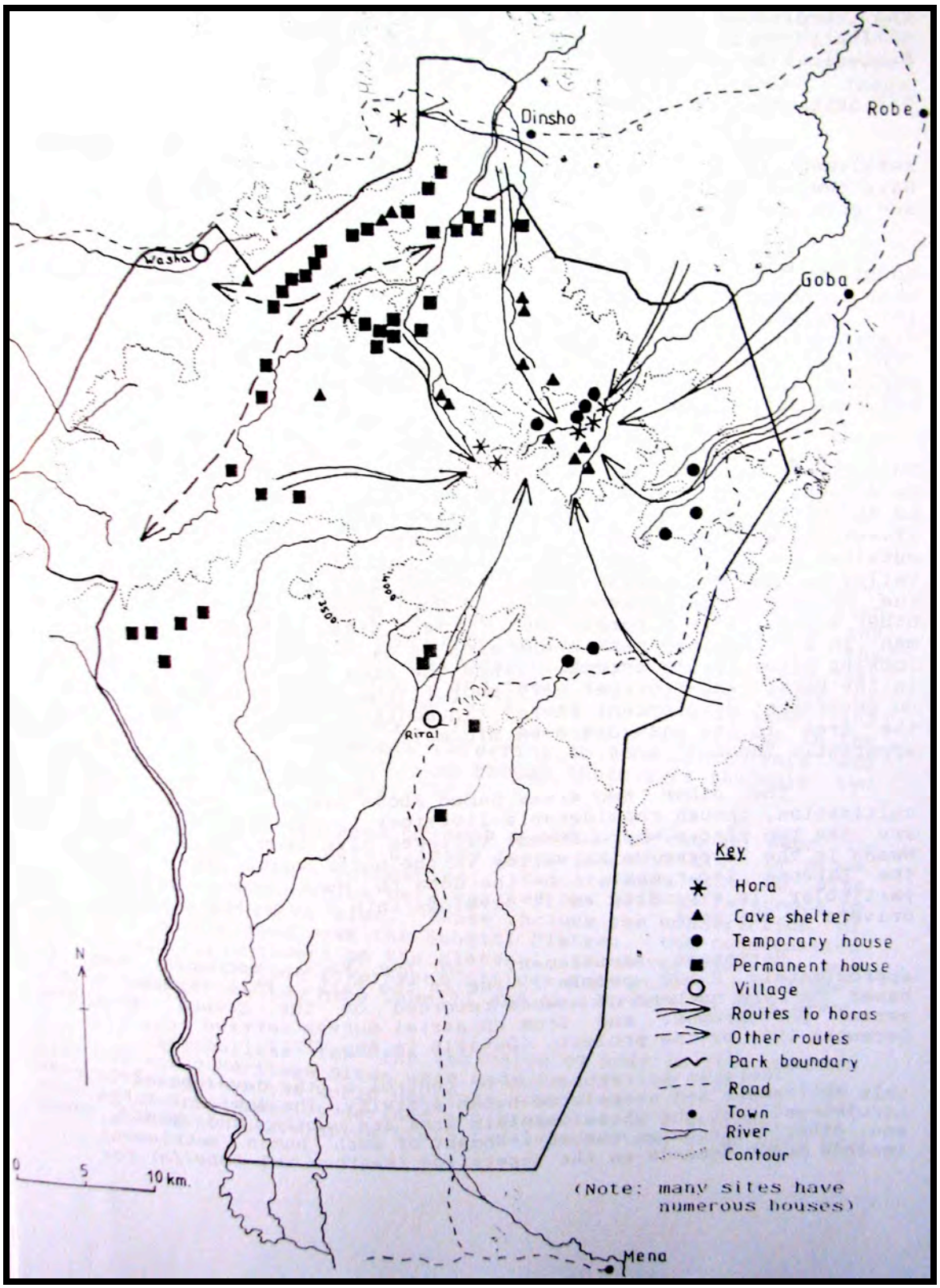
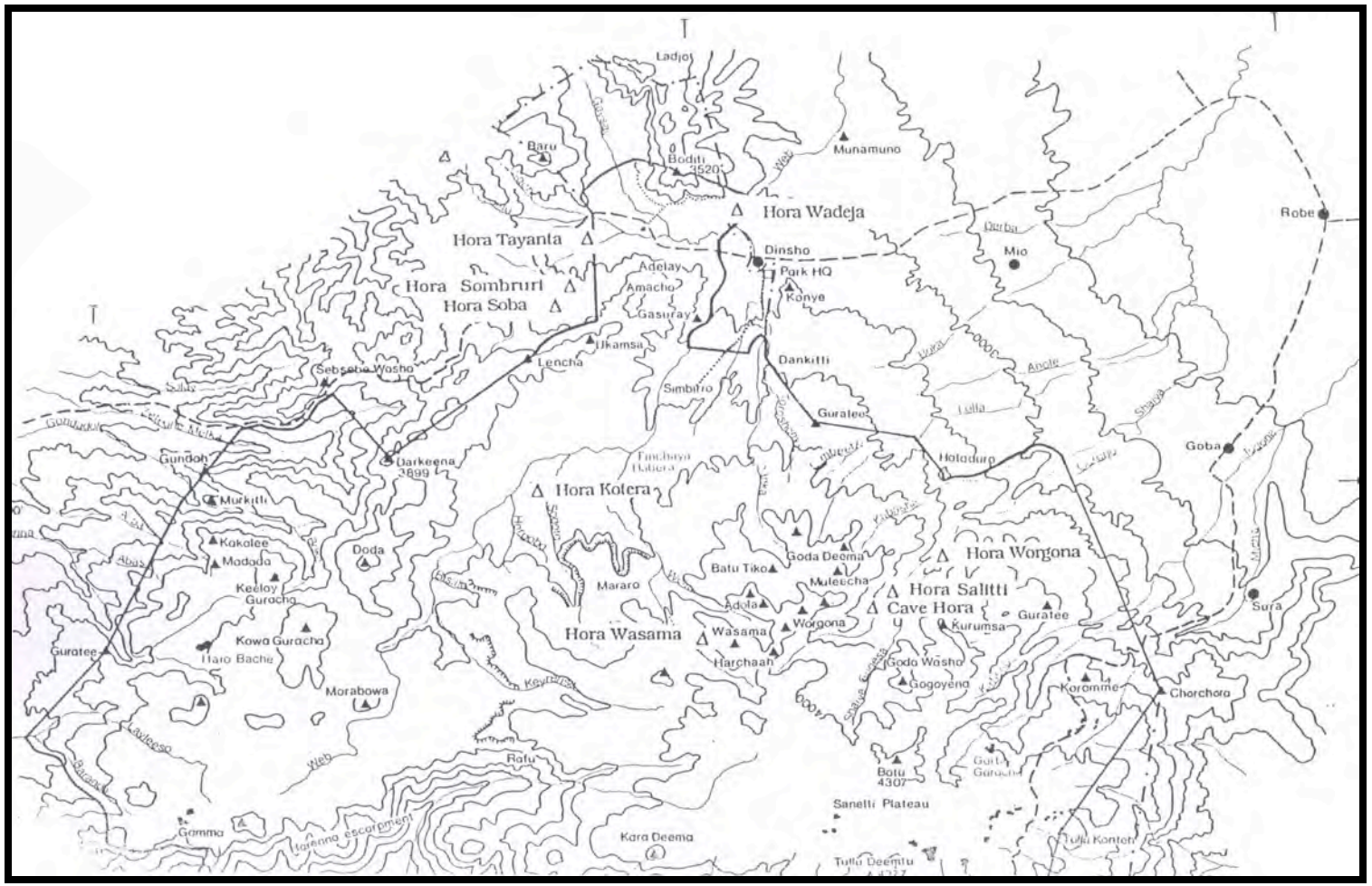


Figure 1.2 Northern extent of Bale Mountains National Park showing location of *Hora* (Kemp-McCarthy 1990:3)



Some of the land use changes taking place are exemplified in a study carried out in 2012 of land use change between 1986 and 2006 in the heart of the BMNP in the Harenna Forest. Landsat images ETM+ of the year 1986, and SPOT 2006 were used to identify forest cover changes, rate of deforestation and the type of land-cover to which the forest was converted. The major land-use/land-cover types in the study area were rain forest, ericaceous forest, afro-alpine vegetation, shrub land, grass land, bare land, and agriculture and settlement areas. The total area of agriculture and settlements increased from 63,950 ha. (9.4%) to 1,00,080 ha. (12.3%), grass land increased from 33,185 ha. (4.8%) to 48,603 ha. (7.1%) and afro-alpine vegetation increased from 14,294 ha. (2.1%) to 22,827 ha. (3.4%) during the period 1986–2006. During the same period, the forest cover has declined from 3,13,472 ha. to 2,92,274 ha. This implies that the forest coverage had decreased by 21,198 ha. at an average rate of 1,059.9 ha. per year (Alem et al 2012).

Figure 1.3 Land use cover in Harenna in 1986

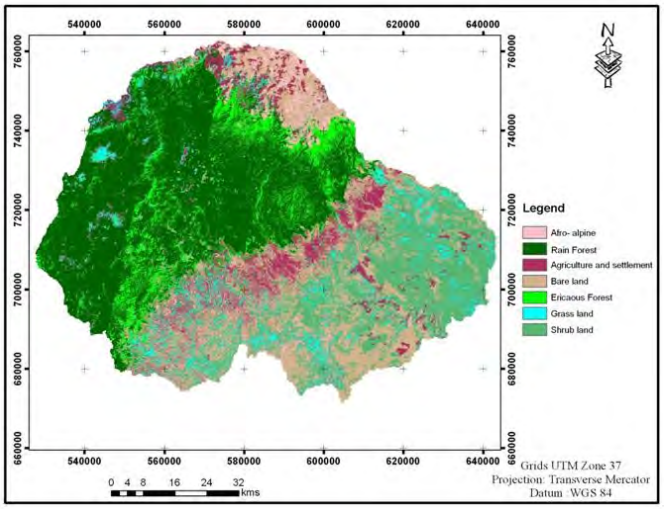
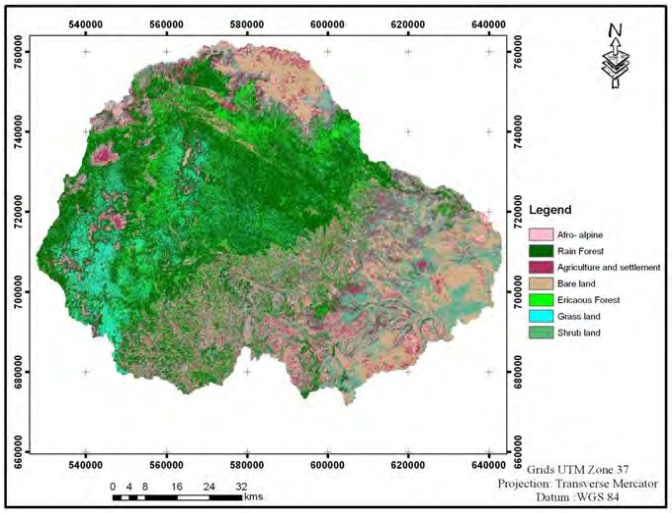


Figure 1.4 Land use cover in Harenna in 2006



1.3 Livestock and BMNP

Unquestionably the number of people and livestock living in and/or using the BMNP has increased significantly since Brown's visit in the early 1960s. Human populations within the BMNP were estimated at 2,500 in 1984 rising to 7,000 in 1992 and 20,000 in 2004 (although it is unclear how these figures were reached) (B & M Consultants 2004).

An ongoing study by the Ethiopian Wolf Conservation Project (EWCP) measured densities of cattle in the Web Valley[9] as between 25 per km sq and 65 per km sq in the peak usage time (mid-wet season) in 1999. At this time livestock usage of Western and Eastern Sanetti areas was low, though had been absent until 1995.

In 2004 the BMNP staff also surveyed the livestock population within the Park and arrived at a figure of 168,000, which is broken down in Table 1.1 and Figure 1.1. It is unclear how the study was carried out and whether it is based on estimates or a physical census.

Table 1.1 – 2004 Livestock Populations within the BMNP[10]

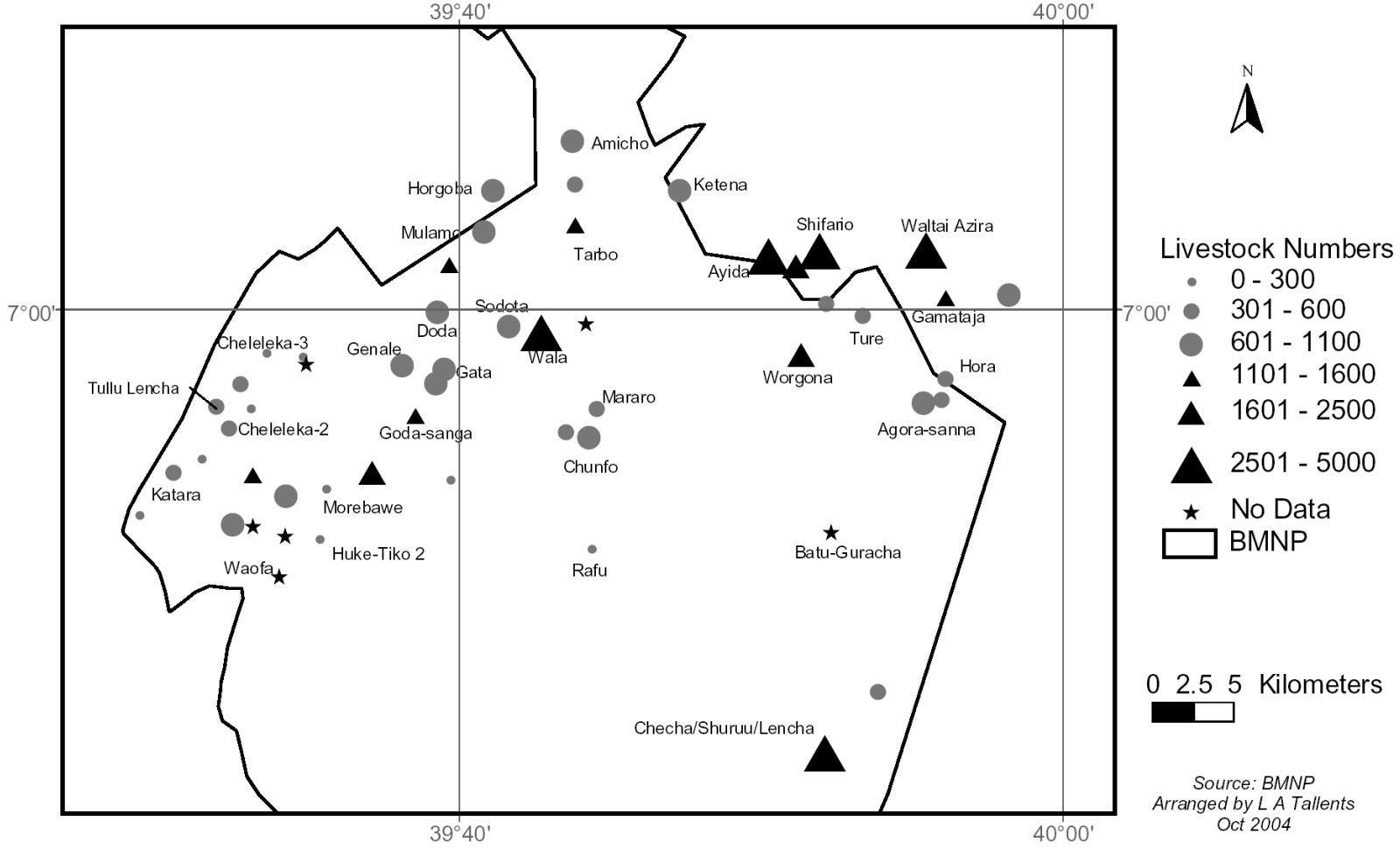
Livestock Type	Sanetti Plateau	Web Valley	North Eastern Park Area	West of Web Valley	**Harena Forest**			Total
					Rira	**Western Edge**	**Hawo**	
Cattle	2,053	7,750	10,684	2,514	2,205	83,340	10,837	119,383
Sheep/Goat	3,393	11,954	7,100	2,727	1,577	9,806	2,847	39,404
Transport Animals	176	1,000	2,758	193	964	2,821	1,610	9,522
Total	5,622	20,704	20,542	5,434	4,764	95,967	15,294	168,327

The study also noted that there was no significant correlation between livestock types and wolf abundances, both in Web and Central Sanetti (Marino et al 2006). Indeed, there are also positive impacts of livestock on wildlife, and a certain amount of livestock are necessary to maintain particular ecosystems: cattle keep the grass short on the plateau area which allows the Ethiopian wolves to catch the field rats (Tesfaye Hundessa, EWCO, personal communication 2002; Sillero-Zubiri and Gotelli, 1995). Further wolves use cattle as a 'mobile hide' whilst foraging and thereby increase their hunting success (Sillero-Zubiri and Gottelli, 1995). In addition it is generally agreed that livestock and grazing have a less negative impact on the environment and wildlife than does ploughing the land for crop farming.

[9] The Web Valley is said to be the most heavily used area in the Park – five times higher than anywhere else Marino et al. 2006).

[10] EWCP have continued to collect figures on livestock populations in the Park. In order to update the 2004 figures the researchers of this study contacted EWCP for updated figures, but received no respnse.

Figure 1.3 Number of livestock in afro-alpine are of BMNP as per study carried out in 2006 (BMNP 2006)



Despite attempts to control livestock numbers through such as impoundment and fining, this had little effect. For example in the year 2000, around the Park headquarters in Dinsho it was common to arrest livestock owners with livestock who were trespassing in the Park. The cattle and owner were impounded in the local jail/camp and kept there until a fine of ETB10 per cow was paid (Flintan personal observation 2000). In 2007 there was little effective control at all. At that time the BMNP concurred with the view that local livestock owners have been effectively forced into the Park due to land use policies outside of its own borders (BMNP 2006).

A study carried out over a 3-year period showed that community members lost a total of 704 livestock to wild carnivores (mainly hyenas but also leopards, jackals and servals), causing a loss of potential revenue of 12 USD per year per household. Dogs are kept to protect the livestock. During 250 nights of observation in ten settlements, households were alerted to the presence of hyenas on 80 occasions by the barking of their dogs (Atickem et al 2010).

A study published in 2012 used satellite imagery to study land use change across the Bale region, comparing data from 1973, 1987, 2000 and 2008. Within a representative subset of the study area (7,957.5 km^{-2}), agricultural fields increased from 1.71% to 9.34% of the total study area since 1973. Natural habitats such as upper montane forest, afroalpine grasslands, afromontane dwarf shrubs and herbaceous formations, and water bodies also increased. Conversely, afromontane grasslands decreased in size by more than half (going from 19.3% to 8.77%). Closed *Erica* forest also shrank from 15.0% to 12.37%, and isolated *Erica* shrubs have decreased from 6.86% to 5.55%, and afroalpine dwarf shrubs and herbaceous formations reduced from 5.2% to 1.56%. Despite fluctuations the afromontane rainforest (Harenna forest), located south of the Bale Mountains, remained relatively stable (Kidane et al 2012).

In 2015 ongoing research on livestock sitings and numbers suggests that there were about 726,020 heads of livestock the afroalpine area of the Park during the wet season. This is roughly the same amount of livestock sited in 2010 (600,358) and 2012 (685,825) (BMNP 2015).

1.4 Introduction to this research study

This research study was undertaken by ILRI for IWMI (International Water Management Institute), who is leading the research of the EU-funded Support to the Horn of Africa Resilience (SHARE) project until November 2017. SHARE works across the Bale EcoRegion with the aim of conserving biodiversity and ecosystem functions and services in the region, and to improving the wellbeing of communities that depend on these functions and services. A consortium of organisations is working to this end including FARM Africa, SOS Sahel Ethiopia, Frankfurt Zoological Society (FZS), Population Health Environment Ethiopia Consortium (PHEEC) and IWMI.

The research component of SHARE set out a number of inter-related research studies that aim to build better knowledge and understanding of sustainable eco-regional management practices – this research study is a contribution to this. Not only will this study present a clear picture of current livestock land use and dynamics, but it also provides the opportunity for a comparative analysis of the situation today compared to 2007, when a similar study was undertaken. The study in 2007 was completed for the BERSMP (Bale EcoRegion Sustainable Management Programme) jointly implemented by the Ethiopian government (namely the Bale Forest Enterprise) and NGOs – FARM Africa and SOS Sahel Ethiopia. It is documented in the report:

Livestock and Livestock Systems in the Bale Mountains EcoRegion (2008) by F. Flintan, W. Chibssa, D. Wako and A. Ridgewell.

This research study, undertaken in 2015-2016 was carried out in the same PAs and woreda as the study undertaken in 2007. Four woreda are included – Delo Mena, Goba, Nensebo and Harena Buluk and nine PA/kebele (See Table 1.2). The woreda were selected in 2007 by the BERSMP, as good representation of the different livehood systems and socio-ecological systems across which BERSMP was working. The sample kebele were selected for the study by the government partners and the BERSMP in order to have a selection of:

- PAs near the forest
- PAs far from the forest
- PAs in the middle (only in Goba woreda).

For this research study in 2015-2016 the same woreda and kebele were selected in order to provide the opportunity for the comparative analysis across the almost decade (2007-2016).

Table 1.1 Criteria for Selection of PAs

	Pas		
Districts	Adjacent to forest	Away from forest	In the middle
Goba	Fasi Angesso	Ashuta	Hilasa
Delo Mena	Erba	Berak	
Harena Buluk	SoduWelmal	Melka Arba	
Nensebo	Gerambamo	Solana	

It had been anticipated that 3-4 days would be spent in each PA with the research team camping over night when necessary. However, the team were met with unexpected heavy rainfall, which created difficulties in moving around, and for staying in village areas (see below). As such the time spent in villages was less than anticipated. Where possible a representative from the zonal and woreda development office joined the team to introduce them to the woreda/kebele heads and present the research, its objectives and plans. Further the research proved a capacity building process for these government personnel and university personnel from Meda Welabu University that joined the research team.

A range of participatory tools was used to initiate discussion and improve understandings. These included:

- Wealth ranking;
- Trend analysis;
- Seasonal calender;
- Mapping of rangeland resources and grazing routes;
- Proportional piling of preferred fodder; types of livestock; grazing areas etc; and
- Observation.

A system of coding was used to reference all interviews and group discussions. This has preserved the anonymity of the respondents. The system of coding used reflects the woreda and PA from where the information is collected, with FGDs and KIM/F (for key informant interview male or female) so the reader can identify this with ease. For example a reference from a FGD in Delo Mena, Berak PA would be DMBE_FGD_01.

The team attempted to include a representative group of respondents including men and women; old and young; rich and poor. However though women were able to join the group work, it proved difficult to talk to women on their own, and therefore most of the individual interviews were carried out with men.

Plate 1.1-1.3 Undertaking mapping of livestock routes with local communities in the Bale Mountains Eco-Region

1.5 Challenges of the research

The research aimed to be as participatory as possible, as well as an opportunity for building the capacity of local researchers. Students from Meda Welabu University, Robe, who joined the research team as research assistants, had limited experience in PRA methods of data collection and undertaking semi-structured interviews or facilitating focus group discussions. As a result time was required for training, follow-up and mentoring. It was also challenging to identify committed female researchers who had the appropriate skills as well as being willing to work in often-adverse conditions. This meant that the information collected in the first one or two sites was more limited than that collected in later sites where researchers were more experienced and confident.

Respondents particularly female respondents were often distracted in group meetings and keen to leave to complete chores and other activities. As such they often finished research activities quickly and were not willing to hang around for the more indepth discussion or exploration of results.

The weather during the first phase of the research undertaken in May and June was unusually wet (the rains were later than usual), which caused significant problems for vehicle access, the comfort and morale of the researchers, and meeting communities resulting in delays and the incompletion of all research planned. In Berak kebele in particular rains prevented use of the vehicle and the team had to travel more than 30 km on foot and pack animals. The absence of the vehicle in the kebele meant that the team were limited to talking to community members relatively close to the main settlement area.

The research was undertaken at a time of significant political sensitivity. This was due to challenges against government forces being made by the Oromo people in general (due to general unrest in the Oromia region) as well as more localised unrest because the BMNP had been recently gazetted and meetings were being undertaken by local government and FZS on

demarcation of boundaries in the areas where the research was taking place. As such people were more wary than they would normally be about sharing information on livestock numbers, and land use and particularly in the NP. In addition travel bans to the region by ILRI meant that the research has to be postponed several times.

1.6 This report

This report provides a comparative analytical study of livestock land use, livelihoods and change over a nine-year period from 2007 to 2016. The report begins with a brief overview of the geography and climate of the study area. Then the report is divided up into four sections focusing on the four woreda where the research was conducted. Each of these sections commences with a short introduction to the woreda, the dominant livelihoods systems, climate, and woreda-level livestock numbers. In most cases livestock population data at this level allows a comparison between years 2000, 2007 and 2015. Each section then considers in detail the data and information collected in 2016, and makes a comparative analysis to that collected in 2007 in order to highlight trends and differences. In addition the socio-economic and land use status in 2016 is considered in detail, incuding wealth ranking, the mapping of livestock routes and livestock-related land and resource use, and seasonal calendars. In addition a wealth of information was collected and documented on livestock disease and forage and browse species and their occurrence. Each section concludes with a synthesis of the information collected and trends identified, and based on these, a consideration of future scenarios for each woreda.

The report concludes with an overall analysis of the current situation and trends seen, and their implications for further land use, development interventions, potential conflicts, and likely future challenges and opportunities for the still predominantly livestock-based livelihoods of local communities in the region.

2.0 PARTICULARS OF THE STUDY AREA[11]

2.1 Climate of the Bale Mountains

Southern Ethiopia is within the East African climatic domain, influenced during the larger part of the year by south-easterlies originating over the Indian Ocean. Further the inter-tropical convergence zone, plus altitudinal and topographic influences also affect the distribution of the precipitation in the Bale Mountains. Annual rainfall ranges between 600-1500 (2000) mm depending on relief (Yoseph Assefa et al, undated) (discussed in more detail in Miehe and Miehe 2004).

The diurnal variability in temperature is higher than its seasonal variation. A minimum temperature of -15°c has been recorded on the Plateau (3850m) while a night-time minimum temperature of -3°c was found in the sparsely vegetated areas of the ericaceous belt (ibid).

2.2 Altitudinal and seasonal variability

Those interviewed divided the year up into two or four seasons (see Table 2.1). In the lowlands the year was divided up into two main seasons, though with some communities describing additional seasons inbetween the main ones:

- *Bona* – the dry season (roughly October to March)
- *Gana* – the rainy season (roughly April – October)

In the more highland PAs of Solana and Gerambamo, the year was divided up differently into:

- *Birra* (September – November)
- *Bona* (December – February)
- *Afrasa* (March – May)
- *Gana* (June – August).

What is clear is that all PAs experience little or no rainfall fall between December and February, when highest temperatures are experienced and often strong winds.

Table2.1 Weather patterns in study PAs

PA	*Hagayya*	*Bona*		*Gana*	*Adolessa*
Lowland areas					
Erba	Sep-Nov	Dec-Feb		Mar-May	Jun-Aug
Melka Arba	Nov-Dec	Jan-Apr		May-Jly	Aug-Oct
Sodu Welmal	Sep-Nov	Dec-Feb		Mar-May	Jun-Aug
Berak	Sep-Nov	Dec-Feb		Mar-May	Jun-Aug
Highland areas					
PA	*Birra*	*Bona*	*Fumata*	*Afrasa*	*Gana*
Fasil Angesso		Nov-Jan	Mar-June		Jly-Oct
Hilassa		Oct-Feb			Mar-Sept

[11] Sourced from Flintan et al 2008

Ashuta		Months not stated			Months not stated
Solana	Sep-Nov	Dec-Feb		Mar-May	June-Aug
Gerambamo	Sep-Nov	Dec-Feb		Mar-May	June-Aug

In 2007 respondents of the study suggested that rainfall and water resources have reduced over time due to climate change. and temperatures increased. Further, several respondents commented that they are now experiencing drought on a regular basis particularly in the lowland areas.

2.3 Local names for animal sickness and disease

During the research study community members mentioned a number of livestock sicknesses and diseases as described in the following chapters. The scientific name of these diseases is listed below for reference.

Table 2.2 Local and scientific names of livestock sickness and disease found in the local area

Disease Local Name and Scientific Name

Disease		**Disease**	
Local Name	**Scientific/ English Name**	***Local Name***	**Scientific/ English Name**
Abbaa gorbaa	Black leg	***Martoo re'ee***	Listeriosis
Sombee re'ee	Ovine Pasturelosis	***Botote***	Lumpy skin disease
Biiraa	Babesiosis	***Borte/ Botote***	
Galboo	Unknown	***Dhibee sombaa***	Lung worm
Goondee	Is a kind of toxic leaf which is found in the water body	***maalullaa***	Fasciolosis
Dhibee Tufaa	Black leg	***bishaantuu***	Unknown
Darabbaa	Sheep and goat pox for sheep but lumpy skin disease for cattle	***Dirmammeessa hoolaa fi re'ee***	Sheep and goat pox
Dhibee saree	Rabies	***Kormamu***	Tumor

Maasaa	Foot and Mouth Disease (FMD)	***Citto***	Mange mites (Ectoparasite)
Maasa/ maasaa		***Dhibee biiraa***	Babesiosis
Abbaa sangaa	Anthrax	***Dhibee aannan kukkutu***	Mastitis
Gagabsaa	Heart Water	***Titisa***	Fly
Furtuu	Black leg	***Killis***	African horse sickness
Dhibee qorraa /qabbanaa		***Jogsaa***	Trypanosomiasis
Qufaa looni	Lung worm	***Tummaa***	Trypanosomiasis
Qabannaa (jinni lafaa)			Pasturelosis
Dubarraa (abbaa sangaa)	Anthrax	***Dhibee qaama kukkutu***	Dermatophilosis
Chittoo	Mange mites	***Kan sangaa ija qabu)***	Trypanosomiasis
Zallaqa/ zallaqaa	Pasturelosis	***Fingil***	Newcastle disease
		Darrisa	African Horse Sickness

3.0 GOBA WOREDA

3.1 Introduction

Goba woreda is a predominantly temperate area (78%) followed by alpine (10%), sub-tropical (10%) and tropical (2%) agro-ecological zones. Vegetation cover consists of mountain savanna and coniferous forest that predominate with *Podocarpus* and *Juniperus* trees. BMNP along with adjacent forests and bushland covers a large part of the *woreda* (54.6%). In 2000 pasture (27.6%) and arable land (13%) were the most significant land use types (OSG 2000).

Ayele (1975) provides figures of livestock numbers in the woreda based on the estimates of *balabbats* dating from 1971. These were: cattle 80,000; shoats 100,000; and equines 10,000 although these figures need to be treated with caution.

In 2000, according to local government offices, the populations were said to stand at total heads of 98,732, made up of cattle 74,397; shoats 6,624; and equines 17,711. By 2007 it was said that livestock population had risen to a total of 153,973 heads made up of cattle 88,038; shoats 39,129; and equines 26, 806, showing an overall 29 per cent increase. By 2015, total livestock numbers were said to be total of 190, 726 heads, made up of 95,715 cattle, 74,054 shoats (mainly sheep), and 20,957 equines, around 25% increase. Though the number of cattle has increased only slightly, it is the number of shoats that have increased most significantly. The figures suggest that the number of shoats have risen by a factor of six between 2000 and 2007, and again doubling between 2007 and 2015. If a comparison is made between 2000 and 2015 then shoats would have increased by a factor of 11. Equines have only increased slightly between 2000 and 2015, and in fact there was a drop from 2007 to 2015.

These figures reflect the changing land use in the woreda and human population increase, so more households own livestock. In the case of cattle, less are held per household as grazing areas have been reduced. Sheep and goats (particularly the latter) that are better able to forage for browse in the remaining lands available are replacing cattle. Shoats can also be more easily sold, however receive significantly less income than cattle – suggesting overall that from livestock production, incomes are not likely to have changed significantly despite greater numbers. The reduced number of equines during the period could reflect the reduced reliance on equines for transportation as mechanical transportation and better transport infrastructure has become more available.

In 1975 it was reported that livestock were driven from Goba to Harena during the dry season where they would normally stay between November and April. Most returned to Goba when the *bedessa* rains came (Ayele 1975). More recently it was reported that many stockowners from Goba regularly occupy the Web Valley and Sanetti Plateau within the boundary of the BMNP (B & M Consultants 2004).

3.2 FASIL ANGESSO PA

Fasil Angesso is found near Goba Town just below the foothills of the Sanetti Mountains. Fasil and Angesso were originally two separate PAs reflecting their quite different topography and climate with Fasil lying south-east of Goba Town and being relatively flat, and Angesso bordered

by the chilly Sanetti high plateau.[12] The area is characterised by woodland, valleys and rocks. In 2007 there was little agriculture being undertaken, and where this was occurring it was found as small patches of crops on hillsides. Here it was said that wheat grown took seven months to ripen. In addition the woodland grazing found on the steep slopes was considered poor.

Socio-economics and livelihoods

Livestock is the mainstay of the local economy. Of most importance are cattle, though goats and sheep, as well as horses and mules are also kept. In 2016 numbers of livestock in Fasil Angesso were said to be: 5,849 cattle; 1,953 equines; 2,583 sheep; 213 goats; and 2,166 poultry (Fasil Angesso Administration Office 2016). Today nearly all households also grow some crops on household landholding of an average 1.5 ha in size. Draught power (oxen) is critical for this. Ten years ago crop farming was rare in Fasil Angesso, but today most households grow something, for example barley, potatoes, garlic or onion (barley and potatoes being mainly for home consumption). Average land holding for farming per household is 1.5 ha.

In 2007 the wealth ranking showed that 2% of the population were considered to be 'rich', 11% medium, 61% poor and 26% destitute (with only access to land of less than 1 ha, and sometimes owning a donkey). In 2016 the wealth ranking showed that the majority of the population can now be considered 'medium', with livestock numbers seemingly increasing per household significantly and the growing of grain being much more important than previously. The reason why an increase in livestock numbers was indicated (with rich said to hold approximately 100 cattle and 120 shoats i.e. goats or sheep in 2016 compared to rich having 30+ cattle and between 15-20 shoats in 2007) are not clear and does not reflect the overall trend seen in the region.[13]

The local administration office has one land use administration expert, one livestock expert and one agronomist, though it was suggested by a government official that extension services for both crop and livestock were not adequate.

Table 3.1 Wealth Ranking in 2007

Total no. of households: 253

Rich 'sorresa'	Medium 'giduresa'	Poor 'harkgadesse'	Desitute 'hiyyeese'
30 + cattle	10-15 cattle	Up to 4 cattle	0
30-40 shoats	15-20 shoats	5 shoats	0
7-10 equines	4-5 equines	2 equines	1 donkey
4-8 ha. Land	2-3 ha. Land	2 ha. Land	1 ha. Land
4	28	154	67
2%	11%	61%	26%

[12] It would appear that the two PAs were combined due to the requirement for kebeles to be combined in order to be chaired by literate, salaried chairman; and because of lack of funds for salaries, some PAs were combined.

[13] The reason for these differences are not clear – it would appear that the figures provided in 2007 were significantly less than reality (see for example the 2016 trend analysis reports the average number ten years ago was 150 cattle per household): this could have been a problem in translation or interview, or it could be because the community purposefully under-reported their livestock numbers in case they would be penalized as a result. Alternatively it could reflect a genuine growth in wealth status or another reason.

Table 3.2: Wealth Ranking in 2016[14]

Criteria	Duressa (Better off/rich)	*jidu galessa* (Medium)	H*iyeessa* (poor)
Crop yield (quintals)	50 quintal	25 quintal	3
Cattle	100	50	3
Shoats	120	25	4
Equines	9	6	2
Corrugated tin roof	Yes	No	No
	5%	**60%**	**35%**

.

There was general agreement amongst community members that the land available for grazing in the PA has reduced due to an increase in agriculture. To compensate for this the community relies heavily on using grazing on the Sanetti Plateau and in Rira PA. However both these areas are becoming increasingly difficult to access, with much of the Sanetti Plateau and the forests around Rira PA being found within the BMNP. In addition, since 2009 the Oromia Forest and Wildlife Enterprise (OFWE) (see Box 3.1) has increased its interests in the area (discussed further below).

Box 3.1 Oromia Forest and Wildlife Enterprise

The Oromia Forest and Wildlife Enterprise (OFWE) is an autonomous fully government-owned organisation established with regulation number 122/2009, issued in July 2009 by the Oromia State Council under the Federal Democratic Republic of Ethiopia. OFWE works to ensure conservation, sustainable development and the use of forest and wildlife resources in its concessions through community participation; to ensure supply of forest products to domestic and international markets by enhancing the forest industry; and subsequently contribute to regional and national socio-economic development endeavours. To date, OFWE by concession owns and manages an estimated area of 1.75 million hectares of forestland, including 1.2 million ha of natural forest, 74,000 ha of forest plantations and 470,000 ha of other land types within the Oromia region. Re-demarcation of OFWE's concession has been underway since 2009. Accordingly, about 2 million ha of forest land has already been re-demarcated and it is expected that this figure could rise significantly once the assessment is completed and other vegetation types such as woodlands are included. For the ease of administration, OFWE has its headquarters in Addis Ababa, eight of its branch forest enterprises (Finfinne, Arsi, Wollega, Illu-Ababora, Jimma, Borana, Bale, Hararge) are found at the vicinity where the forest resources are found, and one forest industry (Shager) based in Addis Ababa. Unlike the previous protectionist institutions that were implemented by armed guards to keep people out of the forest, OFWE works to promote the participation of local communities living in and around its concessions in forest and wildlife conservation activities, and in sharing the benefits derived from forest products and services. This strategy has greatly helped to improve the forest condition and livelihoods of the community living in the surrounding areas. OFWE, with involvement of local community and partner NGOs, has initiated REDD+ projects within its concessions with the aim of generating climate finance, including with FARM Africa and SOS Sahel Ethiopia in Bale. Source: http://theredddesk.org/countries/actors/oromia-forest-and-wildlife-enterprise

[14] It was discovered after the research that a kebele's list of households may not include the destitute as they are landless/homeless. This should be checked in future.

With more land being allocated to crop cultivation and reduction in the size of available open grassland over the years as well as woodland browse, the time taken to access wet and dry season grazing lands has increased significantly. In 2016 respondents said that it now takes 12 hours to access grazing in the wet season, whereas ten years ago it only took 2 hours and/or livestock were grazed around the homestead; and the time for accessing the dry season grazing areas has increased from 1-2 hours ten years ago to six hours today. Though in 2016 community members said that the time to access the all-important mineral springs (see Box 1.2) has increased by from 30 minutes to four hours, in 2007 community members were already saying that it took four hours, so in reality it would seem that this has not changed. As a result of these changes it is said that the money raised from livestock has decreased by half.

Table 3.2 Trend Analysis Matrix undertaken in 2016 Fasil Angesso

Characteristics	**10 years ago**	**Present**	**Significant events (if any). Reasons for change**
Quantity of open grassland available for grazing	●●●●● ●●●●●	●●	Much of the grasslands were overtaken by BMNP and Oromia Forest Enterprise
Quantity of land under crop production	●●	●●●●● ●●●	Population pressure and increased desire of the people to engage in crop cultivation
Time taken to access grazing in wet season	2 hours	12 hours	
Time taken to access grazing in dry season	1 hours	6 hours	
Quantity of browse available for grazing	●●●●● ●●	●●●	
Changes in access rights to grazing	●●●●● ●●●●●	●●	The right to graze livestock in the area is very small at present
Type of livestock kept	Same	Same	But their number has decreased dramatically
Quantity of cattle owned by individual	150 (on average)	50 (on average)	
Number of conflicts with wild animals for grazing	●●●●●	●●	Less animals around today
Number of conflicts with wild animals that kill/take livestock	0	0	Less animals around today
Time needed for accessing water for livestock	15 to 30 minutes	Not much change	
Time needed for accessing mineral springs	30 minutes	4 hours	Access routes are blocked by BMNP
Changes in income from livestock	●●●●● ●●●●	●●●●●	
Changes in food from livestock	●●●●● ●●●●●	●●●●●	Decreased by half

Climate and climate change

The community identified two seasons – *Bona* or dry season and *Ganna* or wet season – each with six months – as described in Table 3.3

Table 3.3 Seasons with respective months

Waqtiilee (Season)	Local name of month	Equivalent name
Bona (relatively dry)	*Mowlida*	December
	Awala	January
	Akira	February
	Zara	March
	Rajaba	April
	Hexo (Heto)	May
Ganna (wet)	*Sooma*	June
	Fishee	July
	Kirfishee	August
	Hajji	September
	Ashuura	October
	Safara	November

Table 3.4 Seasonal calendar

Seasons / Characteristics		Ganna (June-Nov)	Bona (Dec-May)
Rainfall		●●●●● ●●●*	●●●●●
Temperature		●●●●	●●●●● ●●●
Wind		●●●●●	●●●●
Grazing availability (grass – *marga*)		●●●●● ●●●	●●●●● ●●
Browse availability		●●●●● ●●	●●
Water availability		●●●●● ●●●●●	●●●
Income from livestock sale		●●●●● ●●●●	●●●●●
Livestock product		●●●●●	●●●
Milk yield		●●●●● ●●●●●	●●●●●
Labour demand for livestock related activities	M	●●●●	●●●●
	F	●●●●● ●	●●●●
Labour demand for non-livestock related activities	M	●●●●● ●●●	●●●●● ●
	F	●●●●●	●●●●● ●●●
Incidence of disease		●●●●● ●	●

Notes: * July and August have low rainfall.

Source: Male and female focus group discussions (GOFA_FGD_01)

The above seasonal calendar illustrates the significant loss of grazing and browse resources during the dry season. This results in less productive livestock, less milk and a reduced income from livestock sales.

With the increase in crop farming requiring labour input in the rainy season, labour demand is fairly evenly spread over the year. The increase in demand for women's labour in the dry season suggests that they are more involved in processing harvested products and income-generation activities during this time. In 2007 there was a significant increase in demand for labour for livestock-related activities during the dry season, however as suggested in the 2016 trend analysis, labour for livestock is now at high demand all year round due to the need to take livestock long distances for grazing even during the rainy season.

Grazing and browse resources

In Fasil Angesso it can rain all year round, though in drier years there will not be rain in between December and February, so the concept of wet and dry season grazing areas is less relevant. Wet (and dry) season grazing areas in Fasil Angesso PA are listed in Table 3.4 and mapped in Figure 3.1 and 3.2.

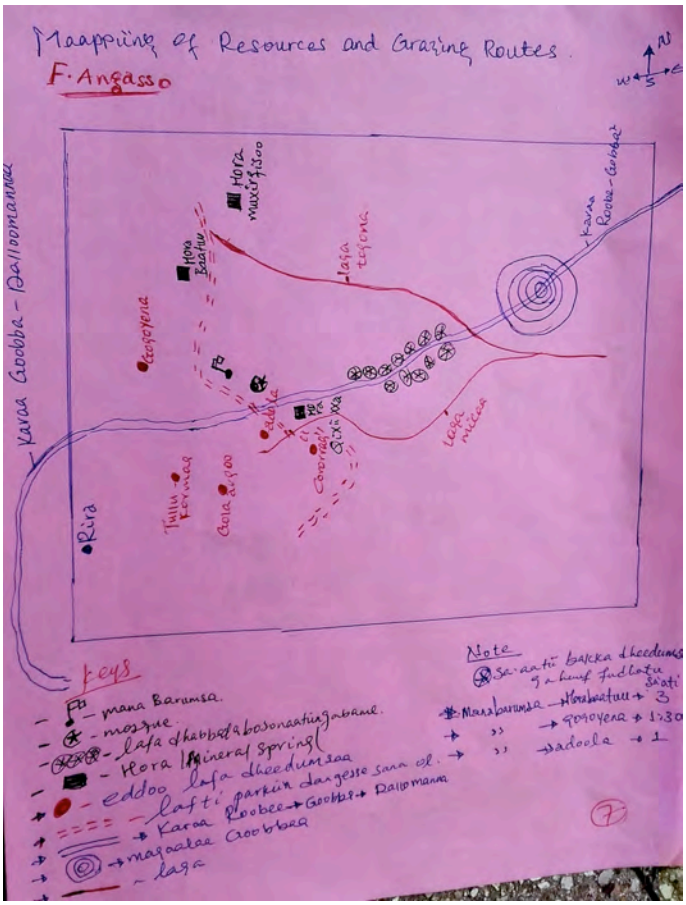
Table 3.4: Wet (and dry) season grazing areas and other resources found in Fasil Angesso PA

Wet season grazing areas	**Characteristics**
Gogoyena	All are situated on the Sanetti Plateau, and most are found within the boundaries of the BMNP. Tulla Korma is considered to be the most important being of good quality and close by. Gogoyena is of highest quality and quantity, but is at a distance. Adoola is close by but of low quality and quantity.
Tulla Korma	
Adoolaa	
Siree	
Chorchora	
Hora Baatu	
Goda Booraa	
Aballa	

In the very wettest months livestock can still be grazed around the settlements as it is too wet to grow crops. Once crops are planted livestock are taken up to grazing areas on the Sanetti Plateau, most of which are located within the boundaries of the BMNP. This is not only because there are few grazing areas left, but also in order to avoid the crops that are now grown there. As in 2007 they may use this area up until June (around six months). The most important and preferred grazing area is Tullu Korma due to its abundant grasses of high-palatability, good for fattening animals, also grazing on the *Erica* ('sato') around Asta. It is considered to be a special

pasture said to give strength to livestock. In 2007 respondents said it took 2 hours to get to the wet season pastures, but today, in 2016 respondents said it takes 12 hours.[15]

Figure 3.1: Hand-drawn mapping of resources and grazing routes (digitised in Figure 3.2)



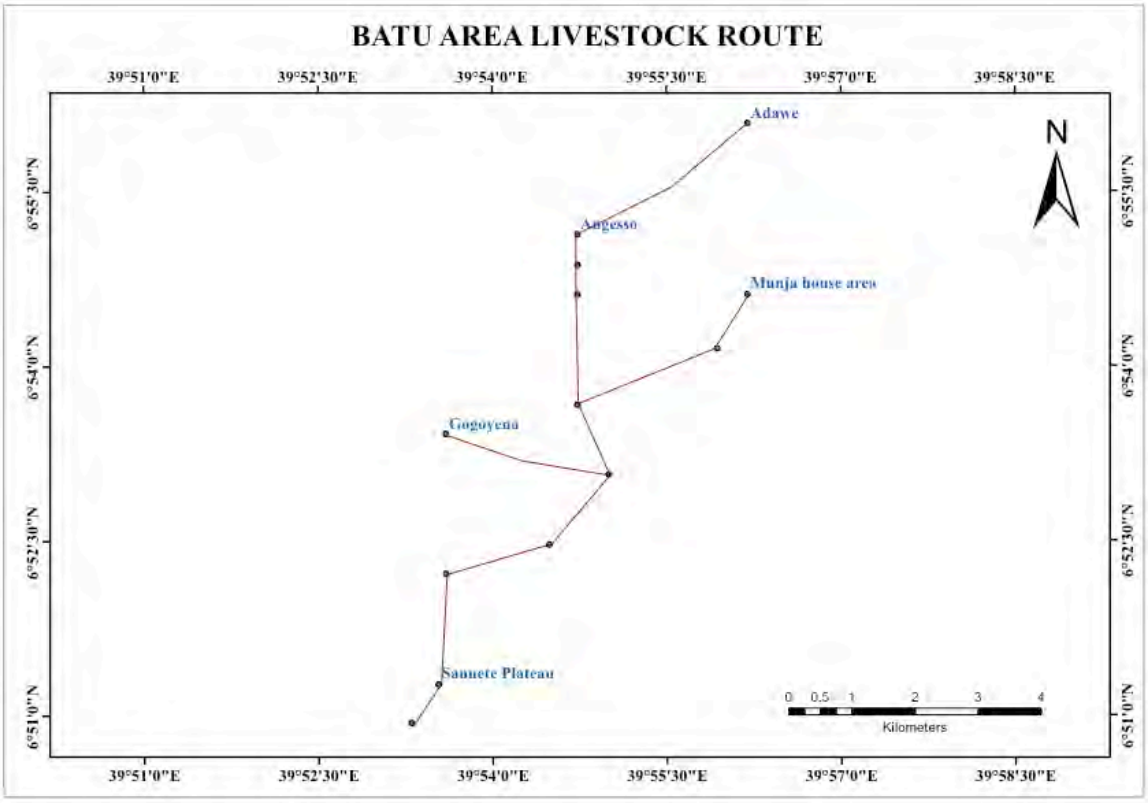
Those living on the Plateau are likely to let their livestock loose to graze at will – though these are without supervision the livestock know the routes to follow and will take themselves the one and a half hours or so to/from grazing areas (GOFA_KIM_01); others will go with their livestock and supervise them. Livestock herders stay in temporary shelters or in the houses of one of several wives. Others 'commute' between their villages and the grazing areas on a daily basis.

Box 3.2 Polygamy in the Bale Area

In Melka Arba in 2007 one respondent had three wives, one of whom managed a business/shop in town and the other two moved with the livestock, whilst he provided them with necessary supplies. They did not have a permanent residence as such, though stayed a longer period of time in the wet season grazing areas often in Berak PA (Flintan et al 2008). In 2016 polygamy is still practised with wives sharing farming plots and livestock production responsibilities.

[15] Wet season grazing areas mentioned in 2007 were Abule Abowesha.

Figure 3.2 Digitised map of major livestock route used in Fasil Angesso



Grass, known locally as *marga* is the major feed source during the wet season. Grasses include *Siddisa (*fed before it flowers for treatment of bloating*), Xooshinee, Garambaa, Xuuqqaa and Saatoo* (though this seems to be a plant, the community use it as a grass and is highly palatable). Browse is mainly available in the wet season and includes *Saatoo, Garambaa, Heexoo, Xoorsoo, Goraa, Anshaa, Kombolcha* and *Aaraa.* Some plants are also valued for their medicinal value, particularly *Xooshinee* (see below).

In 2007 community members complained of a plant called *Balee,* which made livestock sick – it was not possible to identify the plant but it could be the fennel *Ferrula communis.* Though in 2016 respondents did not mention this plant in Fasil Angesso, it was mentioned in other PAs.

During the dry season and once the crops have been harvested the livestock is brought back to the *kebele*, and allowed to graze on the crop residues left in the fields. Livestock may be returned to the grazing areas on the Sanetti Plateau for periods of time. In the dry season *Chaffaa* is the grass found mainly close to riverbanks, and is the main source of feed. *Saatoo* is the main species of browse available. The grazing areas of Chaffaa Bal'a and Chaffaa Zabi are known for their reasonable grazing, but are open access and heavily used.

In 2007 community members said that it took 1-2 hours to get to dry season grazing areas, but today (2016) it takes 6 hours.[16]

[16] Dry season grazing areas mentioned in 2007 were the Sanetti Plateau including Tullu Dimtu and Asta; Adule Abowesha; Oboro (forest area); and Shedom in adjacent PA though only used occasionally.

Table 3.5 Proportional piling of major grazing/fodder species and indicators 2016 (GOFA_KIM_03)

	Adequate grazing close to home	Plentiful supply all year round	Not expensive*	Palatable	Has medicinal value
Marga	0000000(7)	0000(4)	-	00000000(8)	0(1)
Saato	0000(7)	00000000(8)	-	000000(6)	0000000(7)
Gaarambaa	00000(5)	00(2)	-	0(1)	0(1)
Xooshinee	000(3)	000(3)	-	0000(4)	00000000(8)
Ansha	0(1)	00(2)	-	0(1)	0(1)
Xoorsoo	00(2)	0(1)	-	0(1)	00(2)

***Fodder is not purchased.**

Table 3.6 Proportional piling of grazing resources 2016 (GOFA_KIM_03)

Characteristics	Sanetti	Hadwe	Munjaa
Good Quality	000000000000(12)	000(3)	00000(5)
Good Quantity	0000000000(10)	0000(4)	000000(6)
Close to home	0000(4)	000000000000(12)	0000(4)
No control over access	000(3)	00000000(8)	00000(5)
Critical dry season grazing	00000000(8)	0000(4)	00000000(8)
Protected but have permission to graze	0000000000(10)	0000(4)	000000(6)

Wooded areas used for grazing and browse are found at Angesso and Hadawe and on the Sanetti Plateau. However, the Angesso woodland is being heavily encroached by crop cultivation, while the Hadwe woodland is now under the management of the OFE authority and access for grazing is limited. If livestock is caught in this area, the owner of the livestock is fined 15 Birr. Community members said that the OFE told them that livestock disturbs the forest and so much be excluded from it. They said "we tried to convince them that our livestock does not damage the forest, but the Forest Enterprise refused to cooperate; now our livestock are suffering from shortage of feed. The grazing land that we used to access in this forest was highly suitable, good palatable feed for our livestock."

Sometimes wild animals including hyena and leopard attack domestic animals. However, this is not new, and the incidence of such cases has reduced because the numbers of wild animals have reduced.

Recent forced changes in livestock land use and movements

In 2007 the amount of grazing in the PA had already significantly reduced due to increasd crop cultivation. In recent years there has been a significant increase in crop cultivation in the area. This is resulting in a shortage of grazing areas and is destroying the woodlands.

However, the most critical issue for the community at this current time is that the BMNP administration is now stopping them from grazing on the Sanetti Plateau, despite us having used it for generations. We are very upset and frustrated about this (*yaaddoo guddaa ummataatti ta'ee jira* – it is anxious for our society); our livelihood is dependent upon livestock, and we cannot survive if we are prevented from using the Sanetti Plateau for grazing. The BMNP has told the community that livestock disturbs the wildlife in the Park (*Bineensi bosonaa akka hin tuqamneefi* – to protect wild animals).

Community members said: "the BMNP administration, recently required us to sign a document saying that we would not enter the Park's boundaries. Community members are now punished if they enter the Park with their livestock. In 2015 some of our *kebele* members had set up temporary homes on the Plateau whilst they looked after their cattle grazing there, but they were forced to leave the grazing area and their traditional houses were demolished." Community members described how before 2015 they had an agreement with the Park's administration allowing them to graze their livestock in the Park for about six months and then to move out. This they said was compatible with their usual practice of grazing and they were happy to keep to this agreement. "But nowadays they are preventing us from entering the Park's boundary altogether; they have constructed a fence in which they can trap our livestock and punish us (*dallaan horiin yoo seene keessatti qabamee hidhamu qophaahee jira)*. This has led to a scarcity of livestock feed and thus, our livestock are not as productive as in the past." They added: "we are not getting any benefits from the Park, but we are losing our grazing areas because of the Park. *Ummataaf bu'aa tokka kennaa hin jiru, paarkiin nurratti ijaarame malee bu'aa tokko hin araganne* – it has no advantage for the society, the Park has not given us anything. Noone is listening to us – we are voiceless and vulnerable (GOFA_FDM_01).

The community argues that they are the ones that have taken care of the wildlife for generations and this is why wildlife has survived up until now. Wildlife can graze with our livestock without conflict and disturbance. "It is we who safeguard the environment and the ecology, but the beneficiaries are others. *Kan eegu nuhi kan irraa fayyadamu ka biraati* – we protect it but it is others that get use from it."

Livestock water resources

There is still abundant water available for livestock in Fasil Angesso. Even during the dry season there are permanent water sources in the Guracho, Togana, Adola and Micha rivers/streams, and other smaller ones for livestock use. In 2007 it was said that the River Magida was the main source of water, with a journey of 30 minutes, though access was increasingly being curtailed due to farming along the banks.

Mineral springs and licks

Mineral sources for livestock in the *kebele* include Hora Muxurqisoo (Muturqiso) situated in Itittu Suraa *kebele*, Hora Qixxiixa (Qitita), and Hora Baatu. These serve livestock during both dry

and wet seasons. In 2007 respondents said it took four hours to get to the *hora*[17], and this appears to be the same. They also said that they only needed to use the *hora* during the *bona* (November – January) and *furmata* (March – June) when the livestock get thin due to lack of grass and nutrients.

Fodder and feed

Crop residues (cut and dried) are fed to livestock as a feed supplement in both dry and wet seasons (GOFA_FGM_01; GOFA_KII_01). In addition, the chaff/husks left over after the grinding of the cereal are fed to livestock (*fagulo* and *furushkulo*) (GOFA_KII_01), *hansaraa, hori gabasu fi dhaleef binna* (fattening) (GOFA_FGM_01. In general people do not purchase forage, and there was no evidence of cattle cake or other concentrates being fed to cattle.

Livestock production, health and marketing

Livestock extension service is not strong in the PA. Most livestock kept are local breeds. Some respondents however keep a small number of cross-breeds. The farm-gate price of a heifer local breed is between 2500-4000 Birr, and for a cross-breed is at least 1000 Birr more. The price of an adult local breed cow is 5-6000 Birr, and 7000-10,000 Birr for a fattened bull or ox. Cross-breed cows sell for 20,000 Birr (and male adults are not kept). Horses costs ETB5000 and a donkey 2000. Young sheep average 6-800 Birr, adult female 7-1200 Birr, and rams 1300 Birr. Young goats average 600 Birr, adult female 800, and male goats 1000. Sheep hide/skin averages 25-40 Birr per piece. Milk can be sold for 20 Birr per litre, but most is used for household consumption. Draught power can be rented for 33 Birr per day – the problem is ensuring availability when required.

The average number of livestock held by a household is 50 cattle including two oxen, and between 50-70 sheep and goats. Most medium to rich households keep at least two oxen for draught power. Draught animals are used for around 66 days of the year. Females are sold at around four years old and male at five. Milk obtained from lactating cows averages 2 litres per day; and cross-breeds can produce 6 litres if fed well.[18] A government official said that the urine of the livestock pollutes the area and can lead to disease – it causes some plants to dry up. Further because the area is quite hilly, the livestock contribute to land degradation and deforestation by destroying seedlings with their hoofs.

Livestock diseases are more common in the wet season due to cold weather, and feed related problems. There are some plants such as *sidssa* that increase the vulnerability of livestock to disease.

The major livestock diseases affecting cows and oxen are: *dubarraa (abbaa sangaa), qabannaa (jinni lafaa), qufaa looni* (leads to severe coughing) [lung worm]. The major diseases that usually affect sheep and goats are: *dhibee sombaa* (affects their lungs), *maalullaa (kokkee kan*

[17] In the 2016 trend analysis respondents said that access to the *hora* took 30 minutes ten years ago, however this contradicts the report from 2008, which said it took four hours.

[18] It was suggested by a key informant that though some local people are encouraged by government to keep cross-breed cows, they are not given training on the required husbandry of these cross-breeds: for example, cross-breeds need to be fed better than local cows (with adequate amounts of vitamins and minerals) in order to maintain their health and productivity – if not well-fed they will deteriorate quickly if not die.

*dhiitessu-leads to swelling their throat), bishaantuu (garaa ishee keessatti akkabishaanii kuufamu), dhibee kufaa. And horses/mules are affected by: zallaqa (ni qufaasisa (*causes severe coughing), *darrisa* (affects their backbone).

Weather related livestock diseases also prevail in the grazing area, and these are locally called *dhibee qorraa /qabbanaass.* [Said to be trypanosomiasis but renownnedly difficult to diagnose]. The community say that their livestock has adapted to the climate and environment of the highland areas including the Sanetti Plateau – and if they are forced to spend more time in different environments they will not survive succumbing to diseases such as these.

Animal health services are inadequate in the *kebele* (GOFA_FGM_01). Local community members do not use AI and synchronization services, though they know that this is available (GOFA_KIM_01).

Principle livestock markets are found in Goba and Robe, as has been the case for many years. Livestock keepers tend to hold onto good quality animals and rather, sell low quality and aged animals (GOFA_KIM_01). Livestock products such as milk and butter are mainly used for family consumption, and not sold (GOFA_KIM_01). In 2007, respondents mentioned selling milk, butter and chickens at Goba market as well as larger livestock.

3.3 HILASSA PA, GOBA WOREDA

Socio-economics and livelihoods

Today in Hilassa PA the majority of land is under crop cultivation – either farmed by local people or larger-scale outside investors. Most households still maintain a number of livestock as part of a more integrated livestock-crop system, with reduced numbers of livestock however. This reflects the land use and livelihoods changes already taking place in 2007, where community members complained of significantly reduced access to grazing, crops being grown and with some community members having a house in Goba town as well as in the village.

Table 3.7: Wealth Ranking 2007

Rich	Medium	Poor	Destitute
8 ha. Land	5-6 ha. land	4 ha. Land	0-0.5 ha.
House in town	No house in town	No house in town	No house in town
10-15 cattle	5-10 cattle	2-4 cattle	Up to 1 cattle
10 shoats	5-6 shoats	2-5 shoats	Up to 3 shoats
5-8 equines	2-5 equines	2 equines	Up to 1 equine
5-10 chickens	10-15 chickens	5-7 chickens	1-2 chickens
50-100 quintals of grain	25-50 quintals of grain	10-15 quintals of grain	4-6 quintals of grain
13	60	177	47
4%	20%	60%	16%

Total number of households: 297

Table 3.8: Wealth Ranking 2016

Criteria	Duressa (Better off/rich)	*jidu galessa* (Medium)	H*iyeessa* (poor)
Crop yield (quintals)	60 quintal	12 quintal	No property, only labour
Cattle	11	3	-
Shoats	15 sheep	4 shoats	-
Equines	6	2	-
Corrugated tin roof	Yes	Some	No tin – thatched
No. of children sent to school	All	About 60% send children to school	Not able to send children to school
Savings in bank	20-30,000 Birr	None	None
	10%	**70%**	**20%**

Comparison of the two wealth ranking exercises from 2007 and 2016 reveals a significant reduction in the amount of crop yield with rich said to grow up to 100 quintals in 2007 and only 60 quintals in 2016; medium-poor wealth in 2007 10-50 quintals, whereas in 2016 this had reduced to 12 at the most; and the destitute/poor producing 4-6 quintals whereas in 2016 they were said to grow nothing. In addition the criteria for 'poor' or 'destitute' had been reduced – in 2007 these included 0-0.5ha or land, up to one cattle, three shoats and one equine, whereas in 2016 this had been reduced to **no** property (only able to earn money from providing labour) and were not able to send their children to school.

This suggests that whilst livestock has reduced, community members have also seen crop yields reduced leading to increased poverty in the local population and particularly in the poorer groups.

There is a shift from predominantly barley production 10 years back to the planting of potatoes, garlic and onion. Barley and potatoes are consumed at home and sold in markets.

Table 3.8 Trend Analysis Matrix

Characteristics	Before 10 years	Present	Significant events (if any) or reasons for change
Quantity of open grassland available for grazing	●●●●● ●	◖	Grasslands overtaken by crop cultivation and large scale private farms
Quantity of land under crop production	●●●●	●●●●● ●●●●	Population pressure and increased desire of the people to be engaged in crop cultivation
Time taken to access grazing in wet season	30 minutes	> 10 minutes	No grazing area now and livestock graze around homestead and near rivers
Time taken to access grazing in dry season	30 minutes	> 10 minutes	No grazing area now and livestock graze around homesteads and near rivers
Quantity of browse available for grazing	●●●●● ●●●	●●	
Changes in access rights to grazing	●●●●	●●●●● ●●●●	
Type of livestock kept	Only local	Improved	Recently introduced

	breed	livestock breeds	
Average quantity of livestock owned by individual	25	12	
Number of conflicts with wild animals that kill/take livestock	●●●●● ●●	●●●●	In 2007 hyenas were a great problem, but this appears to be less so now
Time needed for accessing water for livestock	30 minutes	30 minutes	
Time needed for accessing mineral springs	2 hours	2 hours	
Changes in income from livestock	●●●●● ●	●●	
Changes in food from livestock	●●●●● ●●●	●	Dramatically decreased mainly due to livestock feed shortages
Changes in time to collect fodder	> 30 minutes	2 hours	
Changes in amount paid for fodder	-	-	
Genetic improvement activities		●●	
Health improvement			
Vaccination	●●	●●●●● ●	
Spray (dipping)	-	◖	
Use of treatment for internal parasites	-	●●●●● ●●●	
Feeding of locally available concentrates	●●	●●●●● ●●●	

The trend analysis confirms that there has been an almost complete loss of grazing in the PA, and the time to collect fodder has grown four-fold. The move to crop grazing was said to be due to a desire (need) to grow crops and population pressure. The few livestock (said to be on average 12 per household) that are left are grazed around the settlements. As a result of reduced livestock numbers there has been a reduction of income and food from livestock.

People indicated that there is an improvement in the provision of livestock health services, (genetic improvement activities, vaccination, treatment for endo- and ecto- parasites), feeding concentrates and possession of improved livestock breeds.

Climate and climate change

Seasons in Hilassa follow the same pattern as in Fasil Angesso above. There is high frost prevalence in October-November. During the wet season people are mainly engaged in preparing land for sowing and weeding. This is undertaken through five consecutive land preparation stages: *gadila, gilgala, surro, arfaso,* and *fachassa* (sowing).

Table 3.9 Seasonal calendar

Seasons / Characteristics		Ganna (June-Nov)	Bona (Dec-May)
Rainfall		●●●●● ●●●	●●●●●
Temperature		●●●●	●●●●● ●●●
Wind		●●●●●	●●●●
Frost		●●●●● (Oct-Nov)	
Grazing availability (grass – *marga*)**		●●●	●
Browse availability		●●●●●	●
Water availability		●●●●● ●●●	●●●●● ●●
Income from livestock sale		●●	●●●
Livestock product		●●	●
Milk yield		●●	●
Labour demand for livestock related activities	M	●●●●● ●	●●●●● ●
	F	●●●●	●●●●
Labour demand for non-livestock related activities	M	●●●●	●●●●
	F	●●●●● ●	●●●●● ●
Incidence of disease		●●●●● ●	●

Notes: * July and August have low rainfall.
** There is not enough grazing in the *kebele* due to expansion of crop farming. Crop residues and other is given, but there is feed shortage in dry months (see below).
*** Due to lack of grazing this has meant that there are significantly less animal products and less income from them
Source: Male and female focus group discussions (GOHI_FGM/F_01)

Water for livestock

Water is accessed from nearby rivers including Magida (as in 2007), Bashara, Chiqile and Watala. Springs include Dugda Gudda, Kuree, Alanatu, Odo Eela, Tinayo (*Xinnayo*o), Taruura and Ebera. There is not a problem of water availability generally for the livestock in the *kebele*, particularly as livestock numbers have dropped.

Grazing areas

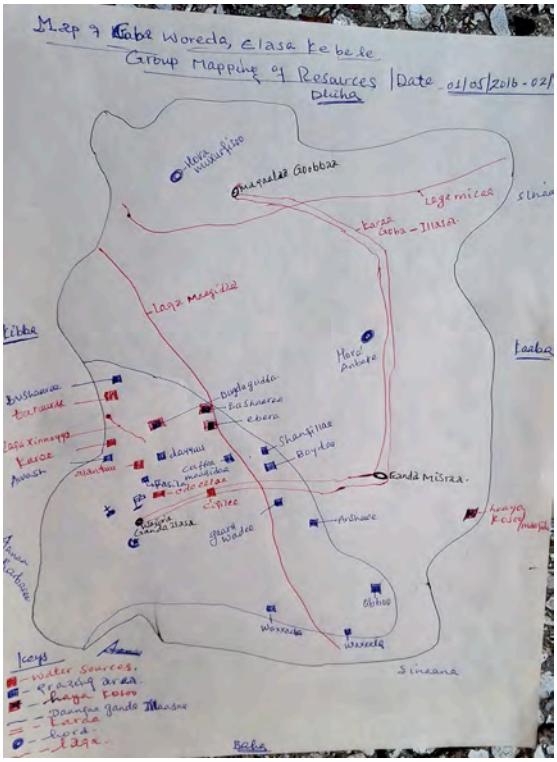
There has been significant increase of land use change in the *kebele* from grazing to crop agriculture with the majority of grazing areas now used for crops either by local people or investors. The situation that now exists means that livestock are restricted in terms of feed and movement, and for many this has meant investment in a more intensive zero-grazing approach that proves labour and input-demanding.

Reasonable wet season pasture that remains include areas such as *chafa* Magida (grassland near the Magida River) though agriculture along the River is making this increasingly difficult, Awash-locality and Bushare. Livestock can be moved to the latter areas for about six months during the

wet season[19]. Though grazing is good along the Magida River there is a problem of cattle contracting a disease called 'fascioliasis' (*dhuukkuba baalee*), which the community said is caused by livestock eating a plant called *gonde.*

Good dry season pasture that remains includes Ambaqa, Boyida, Dhibu, and Shanqala areas. Other areas can include Wade Hill Gara Wade (*Gara Wade*), Wataлla (*Waxxalla*), Dayu, Fasila and Awash areas.[20] Livestock can be taken to these areas for about four months Some wooded areas are used for grazing in Awash locality including *Heeto* (*Hagenia abyssinica*) and *Garamba (Hypericum species).* However, this is not enough to sustain the livestock in the *kebele* across the dry season. Otherwise, livestock is grazed around homesteads and in fields after crops have been harvested (GOHI_FGDM_01). In 2007 respondents said that sometimes grazing has to be negotiated with landowners through 'in kind' payment such as providing the service of ploughing for 4-5 days, or as cash. At this time the community complained about the increase in time to access grazing, however in 2016 there was little change from that time as all accessible grazing areas had disappeared and there was only grazing available around the settlement.

Figure 3.3 Mapping of resources used by Hilassa PA



[19] Wet season grazing areas mentioned in 2007 were Gare Wade (woodland though erosion) and Gare Ejerso (erosion).

[20] Dry season grazing mentioned in 2007 were along Magida River though access being lost due to farming, and Hanshawee areas.

Livestock eat different types of grasses (locally called *marga, tulla, mujaa, mata (maaxaa*) and wood leaves such as *heeto (heexoo*).

Access to the above areas is 'open' with no restrictions, though generally limited to *kebele* community. Sometimes livestock herders encounter verbal conflicts with people who reside in the Awash area, but normally these are resolved easily.

Table 3.10 Proportional piling of grazing/fodder species and indicators (GOHI_KIM_01)

	Adequate grazing close to home	Plentiful supply all year round	Not expensive*	Palatable	Has medicinal value
Marga (grass)	0000(4)	000(3)		000(3)	00000 (5)
Sinaara (oats)	00000 (5)	00000 (5)		000000(6)	000000(6)
Boqqoolloo (maize stalk)	00000 (5)	0000(4)		000000(6)	00000 (5)
Haftee midhaanii (crop residue)	000000(6)	00000000(8)		00000 (5)	0000(4)

**Fodder is not purchased*

Figure 3.11 Proportional piling of grazing resources (GOHI_KIM_01)

	Chaffaa Magida(grass around bank of Magida river)	*Naannoo qaarmaa* (crop stubbles)	Awaash (grazing area)	Busharee (grazing area)
Good Quality	0000(4)	00000000(8)	000000(6)	00(2)
Good Quantity	0000(4)	00000000(8)	000000(6)	00(2)
Close to home	00000000(8)	000000(6)	0000(4)	00(2)
No control over acces	-	-	-	-
Protected but have permission to graze	0000(4)	00000000(8)	000000(6)	00(2)

Figure 3.12 Proportional pilling of grazing resource (out of twenty stone) (GOHI_KIM_02)

Characteristics	**Grazing area**			
	Ejerso	**Arda**	**Hambaqa**	**Safara**
Good quality	000(3)	00000000(8)	00000(5)	0000(4)
Good quantity	00(2)	000000000000(12)	000(3)	000(3)
Close to home	000(3)	000(3)	00(2)	000000000000(12)
No control over access	0000(4)	000000000000(12)	000(3)	0 (1)
Protected but have permission	--	--	--	--
Critical dry season grazing	0000(4)	0 (1)	000(3)	000000000000(12)

Livestock mineral/salt springs and licks

Livestock are taken to the mineral lick – Haya Koso found in Hilassa kebele itself, and to two mineral springs found in neighbouring kebele – Hora Muturqiso in Ittu Sura kebele and Hora Ambare in Dawe kebele. Livestock keepers are able to use the Hora/Haya as they please. In 2007

community members also mentioned adding salt to crop residues when these were fed to the animals.

Fodder and feed

In 2007 some respondents mentioned feeding crop residues and 'green' oats to livestock, and making hay. In 2016 community members mentioned a greater variety of feed and fodder resources suggesting that the variety had grown in response to the need for intensification and alternative sources.

Table 3.13: Feed type, grazing areas and fodder use and feed shortage by season (2016)

Season	**Type and place of feed**		**Purchased feed concentrates**	**Shortage of feed occurs in the months of**
	Type of feed	**Place of feed**		
***Ganna* (wet season)**				
	Crop residue	Around homestead	*Fagulo*	No feed shortage during wet season
	Cereal crop (prepared by grinding –flour)	At home	*Furushka*	
	Enset leaves and stem	Around homestead		
	Oats (*sinaar*) seeds	Around homestead		
	Dried grass	Around homestead		
	Maize leaves and stem	Around homestead		
	Wood leaves *(hetto/heexoo)* and *garamba*)	Around Awash locality in the kebele		
***Bona* (dry season)**				Feed shortage during dry season
	Crop residue		*Fagulo*	December
	Dried grass		*Furushka*	January
	Oats (*sinaar*) seeds			February
	Grass	Around and near the bank of Magida river		
	Wood/leaves	Bushare area near the border of Berebere Woreda		

Livestock health and marketing

In a trend analysis undertaken in 2007 it was said that the numbers of livestock in the PA have dramatically reduced – from 2-3 million during the time of Haile Selassie to 250,000 in 2007. In 2016 the average cattle number per household was said to be eight local, and two cross-breed (as per focus group discussions), with around 10 sheep, a few goats and 3-4 equines. Having said that, the above wealth ranking where the issues were discussed in more depth suggests that vast majority of the community have much less than this.

The majority of cattle in the *kebele* are local breeds, with most households having two oxen, which are worked ploughing for around 90 days per year. Over the last decade there has been

the introduction of cross-breeding in the *kebele*, and today many households have at least two of these. It was indicated that these are sometimes used also for draught power (up to 60 days per year). Local breeds produce around 2 litres of milk per day [litre of milk produced by crossbreed was not specified]. Most livestock is sold when it gets old and production has gone down – for local breeds this is around four years, and for cross-breeds this is around two to three years. Sheep are sold around six months old.

Types and incidence of animal disease include the following among others: anthrax *(abbaa sangaa),* balckleg *(abbaa gorbaa),* mange mites *(chittoo),* ecto-parasites, Newcastle disease *(fingil),* sheep and goat pox *(dirmammeessa hoolaa fi re'ee),* trypanosomiasis *(kan sangaa ija qabu)* (particularly in Bushare area) *anemia*, /dermatophilosis *(dhibee qaama kukkutu),* pasturellosis *(zallaqaa)* and abortion in donkey. Also mentioned was a disease called 'fascioliasis' or liverfluke, which community members believe is caused by livestock eating a plant called '*gonde'* along Magadi River[21] [or rather would be picked up from grazing in the marshy areas]. Some of these diseases are new – and are now common.

Community members expressed their need to have better health services for livestock including how to improve feed for livestock (improved forage and forage preparation), health (prevention of disease and clinic), and genetics (AI/bull services) (GOHI_FGD_01).

Livestock is taken to markets found in Robe, Salqa and Alemgana towns.

3.4 ASHUTA PA

Ashuta is a highland PA in Goba Woreda which is located in the north-eastern direction away from the forests and the National Park. In 2007 it was said that the PA had been known for its rich pastures but by the time of the research grazing had become difficult and extremely scarce during the dry season. Many people were dependent on the state farms and access to crop residues in order to feed their livestock. Movement in and out of the PA had been curtailed, including for accessing rivers.

Socio-economics and livelihoods

Table 3.14 Wealth Ranking Ashuta 2007
No. of households: 482

Rich	Medium	Poor	Destitute
5+ ha land	3-5 ha land	0.5-3 ha land	>0.5 ha land
20+cattle	5-20 cattle	2-3 cattle	0
5-6 equines	2 equines	1 donkey	0
30-40 shoats	5-10 shoats	3-5 shoats	0
60 quintals grain produced each year	30-50 quintals	15-30 quintals	5-10 quintals
3+ beehives	1 beehive	0	0
10-20 chickens	5-10 chickens	3-6 chickens	2-3 chickens
55	276	132	19
11%	57%	27%	4%

[21] In 2007 community members also complained of a disease called *Cimiso*, in crop producing areas.

Table 3.15 Wealth Ranking Ashuta 2016

Criteria	**Duressa (Better off/rich)**	***Jidu galessa* (Medium)**	***Harka qaleesa* (poor)**
Farm holding (ha)	6	3	0.25
Crop yield (quintals)	150 quintal	80 quintal	20 quintal
Livestock	40	15	4
Corrugated tin roof	Some	Very few	Thatched roof
Educate children*	All	All	All
Savings**	40,000 Birr	15,000 Birr	No saving
	30%	**60%**	**10%**

*Regardless of the wealth group, it was said that every child has been enrolled in school. **There is a saving culture with the wealthy having as much as 40,000 ETB in savings.

The differences between the two wealth ranking tables reflect the significant changes that have taken place over the last ten years or so in Ashuta PA. This includes the steady declines of a livestock-dominated livelihood system to one dominated by crop agriculture, integrated with livestock. There has been a steady decline in the number of cattle and other livestock people keep as grazing areas have been converted to crops, livestock numbers shrinking to the resources available, and inputs made available to increase crop yields – cattle dung for example is used as a fertiliser. Few people now harvest honey as local bee populations have declined (blamed on use of pesticides and herbicides on state farms). According to the wealth rankings, the percentage of better off/rich people has almost tripled since 2007. Today it is said that all children go to school, and most people have some savings.

In the last ten years crop farming has increased – before ten years they used to grow barley, but today they grow a much greater variety including wheat, beans, peas, oats, barley and potatoes, with about one-third used for household consumption and the rest sold. Beans and peas obtain the best price. Some grow rye (?) to feed to livestock. The average landholding for cropland is 2 ha.

Table 3.16 Trend analysis Ashuta PA

	Before 10 years	**Current**	**Notes**
Quantity of open grassland for grazing	●●●●● ●●	◖	Grasslands taken over by crop cultivation and large private farms
Quantity of land under crop production	●●●●● ●	●●●●● ●●●●	
Time taken to access wet season grazing	30 minutes	Less than 10 minutes	Because no grazing available so stay near settlement
Time to access dry season grazing	30 minutes	Less than 15 minutes	As above
Quantity of browse	●●●●●	-	

available			
Changes in access rights to grazing	●●●●● ●●●	●	
Type of livestock kept	Only local breeds	Improved breeds now introduced	
Average livestock holdings	Cattle – 59* Sheep – 100 Horse – 10	Cattle – 9 Sheep – 20 Horse – 1	
Beehive	4	0	
Conflicts with wild animals	-	-	
Time needed for accessing water for livestock	0.30 minutes	0.30 minutes	
Access mineral springs	-	-	
Access saltlicks	30 minutes	Not available	Changed to cropland
Income from livestock	●●●●● ●	●●	
Food from livestock	●●●●● ●●●	●●	Dramatically decreased due to feed shortages
Time to collect fodder	Less than 30 minutes	3 hours	
Amount paid for fodder	Nothing except salt	●●●●●	
Hay	●●●●● ●●●●●	●	
Genetic improvement activities	-	●	
Animal health improvement – vaccination	●●●●	●●●●● ●	
- spray dipping	0	●●	
- internal parasites	0	●●●●● ●	
Feeding of locally available concentrates	0	●●●●● ●●●	

* The average number of livestock ten years ago appears to be inflated when compared to the figures provided by respondents in the study in 2007; nevertheless the general trend of significantly reduced livestock numbers is recognised.

Land for cultivation of agricultural crops has gradually increased since the Imperial period where 10 years ago people indicated that the government started rationing land to distribute it to the youth. The average land holding size for cultivation of crops is 2 ha. Currently, crop production includes wheat, barley, maize, rye, beans, peas and potatoes. Crop production takes place during the wet season. Land is re-ploughed five times with a gap of one to two weeks (depending on the condition of the land). Sowing of crop usually takes placed between March and April.

Based on the trend analysis conducted 10 years ago, the reduction in the amount of income earned from the livestock and livestock products sale can be attributed to a significant reduction of livestock numbers in the PA. Rich or better off household's cattle holding size, for instance, reduced by four folds, between the imperial and the current regime and that of equines has shown a reduction by almost half.

The wet season is a more labour-demanding time for community members as land is prepared for cultivation.

The PA has one land use admin expert, one livestock expert and one agronomist.

Grazing areas

In past times Ashuta PA was known for its rich pastures. For example in marriage ceremonies a blessing is given "*Ganga magida ta'ee"* ("horse eats the Chaffa grass and breeds") to the couple, particularly the wife. It means 'be in good condition and have many children as the horses that graze the marshes of Magida.' This illustrates the abundance of quality grassland that was found during Haile Selassie's, particularly the *Chaffa* (or marshland) grass found along the Magida River (Flintan et al 2008). In 2007 these resources were already under significant pressure, with grazing areas being converted to crops, including for distribution to landless youth.

Nearly all land in the PA is now being cultivated. There is a lack of alternative livelihoods in the village despite its relatively closeness to Roba and Goba towns. In addition agricultural technology including improved tools has meant greater ease in cultivating the land. The community would like to see the remaining grazing areas protected for livestock, and the large area covered by the government farm shared.

Today, some wet season grazing can still be found in Kambo, Oyora, on Tullu Tonsare, along the River Togona and Magida Rivers, Darara; and on the government farms even though several community members said that that their livestock get sick there due to the presence of an insect found on leaves of plants. The state farms are found in the adjoining PA so a far distance from some settlements (can take one day to go there and back). Sheep tend to be most easily grazed – around the settlement/PA.

In the dry season the same areas are used plus an area called Sheydaba and Tullu Baya. The time taken to travel to the grazing areas has reduced as grazing is now only available around the homestead. As such the movement of livestock in Ashuta has significantly reduced from the past, and today movement out of the PA is almost non-existent.

A new phenomena is the development of a protected area called "Meles Park" on the bank of the River Togona, where grazing is not allowed (GOAS_KIM_01). In addition one respondent described how the government is giving areas along the Magadi River to small enterprises. If livestock keepers want to graze their cattle there they must get permission and pay for the privilege (GOAS_KIM_03).

Water sources

There is no problem of watering the livestock, with access to Magida and Togona Rivers – though crop farming has increased curtailing access the number of livestock has reduced. It is mainly the task of children to take the livestock to the rivers (around one hour).

Feed and forage

During the wet season cattle feed on natural grass including *chaffaa* (grass near river banks), 'green' oats *sinar*, maize and straw; and straw/stalk of crops after harvest. There are feed shortages between August and October when the land is covered with crops. In addition community members are increasingly using locally available concentrates. A key informant (GOAS_KIM_01) said that he faces feed shortages all year round. He collects fodder for the livestock but often has to purchase concentrates *furushka* and *fagulo* (also being used in 2007), which he feeds to his livestock from May up to August, and from September to December. Respondent M (GOAS_KIM_03) followed a similar pattern, with he and his children collecting the fodder/grass, which is stored until needed.

Another respondent commented that he cuts grass for the livestock, grazes them on crop residues after harvest, collects hay and straw (mainly in January and February), and also cut and dries fodder. He mixes the fodder with *fagulo.* He will also feed *fagulo* and *furushka* as concentrates. He estimates that the cost of supplementary feeding is 1800 ETB per animal (GOAS_KIM_02). A second respondent purchases one quintal of *frushka* per month for his livestock. The price of one quintal of *frushka* was Birr 450 (GOAS_KIM_03).[22]

Though crop residues tend to be readily available, particularly after harvest, they are considered to be less palatable for livestock, with little medicinal value unlike grass (GOAS_KIM_01). *Boqqoolloo* (maize) and *sinaara* (oats) are also considered less palatable but are believed to have some medicinal value.

Mineral springs and licks

Livestock are not able to move to the mineral springs, and over the last ten years the mineral lick (*haya* Magida) has been ploughed up and now used for crop cultivation. As a result livestock keepers give extra salt to the cattle in their feed. Some members mentioned that mineral salts still could be accessed from around the Magida River.

Livestock and livestock disease

Today Ashuta PA has 3,058 cattle; 1,339 equines; 1,349 sheep; 285 goats; and 2,930 poultry. In 2007 livestock numbers per household had already declined. The local cattle breed is considered to be of high quality, but it has declined in number. Though it is still valued community members

[22] In 2007 people were already feeding livestock crop residues. A *mazge* is a cart load drawn by oxen – equivalent to 15 quintals. One respondent said he used 3 *mazge* (or 45 quintals) per year (A5/2007). In those areas where crop residues are given to livestock it seems that the husband and children are responsible for feeding the livestock in the morning and afternoon, whilst they are allowed to graze at will during the day.

value the improved breeds that are now also available. Ten years ago it was said that the average livestock holdings were 15-40 cattle; 10-40 sheep; and around 2-8 horses, whereas today this number had dropped drastically to 6-9 cattle (including often at least one improved breed); 20 sheep, 1 goat, and 1 horse (see also above wealth ranking). As part of this usually two draught oxen are kept – vital for ploughing the land (used for approximately 120 days per year). The prolificacy rate of cattle is 1, with lactation occurring between 6-8 months of the year. Around 2 litres of milk are obtained from local breed cows, and 6 litres from improved breeds. Sheep are sold for meat at about 6 months.

There are few female horses in the area, and these tend to be brought in from Arsi zone. Horses often require extra fodder but tend to require less care than cattle, and sometimes can be used to pull a plough (GOAS_KIM_01). Today there are more chickens kept than ten years ago. Though in the past community members kept hives for honey production, the number of bees have now declined due to the use of herbicide and pesticide sprays on government and private farms, and a general shortage of forage for bees.

Livestock and livestock products are sold in the *kebele*, in Robe town, Chafe Donsa, Alemgena, and Salqa towns, though it would appear that most milk and eggs are used for own consumption. Several respondents complained that the route to Robe town is becoming narrower and narrower due to crop expansion (GOAS_KIM_01; GOAS_KIM_02). Some markets used by the community are in neighbouring Sinana *woreda.* There are markets closer to the PA including in Goba town, but the route for many means crossing the Hirna River, which has no bridge and can be dangerous. The River is known locally as *lago rakko*, which means 'difficult to cross.' A government official said that productivity of livestock has increased due to destocking and improvement in feed and fodder. Cow dung is used as a fertislier on the fields, and as a fuel.

Diseases in the wet season include: *Dhibee bokoksaa*, *abbaa gorbaa* (blackleg), *maasa, horii ija qabee kan boochisu, abbaa sangaa* (anthrax), mange mites, *bichee* (for horse), *rammoo mataa*, *dhibee congaara*, *fingilii* (new castle disease for chicken). Diseases in the dry season include *Baallee (tiruu kukkuta*), *abbaa gorbaa* (blackleg), *dhibee bokoksaa* (a type of livestock disease that bloats their stomach) (GOAS_FGM_01). In addition pastoralists complain that their livestock gets sick when grazing on the state farms, and on the banks of the River Tagona – this usually occurs in the month of May (GOAS_KIM_01). One respondent (GOAS_KIM_03) lost an ox last year when it got sick – he was not able to afford any veterinary treatment.

In 2007 community members again mentioned the plant *gonde*, which sprouts along river banks and swampy areas and can kill livestock immediately. Though respondents in Ashuta did not mention this in 2016, it has been mentioned in other PAs so is obviously still a significant problem in the area.

Livestock veterinary and health extension services have increased with vaccination, dipping/spray and treatment of internal parasites has increased. Though this livestock extension has indeed improved, community members would like to see additional investment in this by the local government. There are clinics in Robe and Shallo locality, and in Hilassa PA used by community members interviewed. Respondents use veterinary services when they can afford them, many respondents cannot. Poorer community members are willing to use AI services, but cannot afford to.

A local breed female cow costs ETB7000-10,000, and a male ETB6500-8000 depending on size, through a fattened bull/ox can fetch 15-20,000. A crossbreed female cow costs ETB 12,000 and a male ETB13,000 (GOAS_KIM_01), goat 1500-2000,, sheep 1,000-1,500 and a donkey 2,000

3.5 Synthesis and future scenarios in Goba Woreda

The three kebele participating in this study are at different stages of intensification of the production systems including moving towards more crop farming. In the past Ashuta PA was known for its rich livestock pasture, however today there is little grazing left with the majority of land under crop farming and settlements. There is very little movement of livestock and none outside the PA unless to access markets. Livestock are mainly reared through zero-grazing practices. The local government is looking to introduce a payment scheme for grazing. According to the wealth status the wealth of the community overall has increased, yet many challenges prevail. State farms in the area offer some grazing alternatives but community members complained that invasive plants introduced by the farms poison livestock, and pesticides/herbicides used have killed off local bee populations. Some land along the rivers is being given to local investors/enterprises.

In Fasil Angesso livestock is still the mainstay of the economy, but crop farming has increased over the last decade reducing land for grazing. To compensate for this the community relies heavily on grazing on the Sanetti Plateau and in Rira PA. This puts them into conflict with the Park authorities and the Oromia Forest and Wildlife Enterprise.

Hilassa PA is somewhere between Ashuta and Fasil Angesso in terms of livelihood systems, with some crop farming and some livestock keeping. However crop productivity appears to have declined, and there are few alternatives for grazing close by. As such the community relies heavily on the use of crop residues and grass of poor quality for livestock feeding at times of the year. As such of all three PAs it is Hilassa that seems to be struggling most reflected in a wealth ranking that suggests that poverty levels may have increased.

In all PAs community members said livestock numbers have decreased, however according to the figures from the woreda administration numbers of livestock across the woreda have increased by 25% between 2007 and 2016. And the number of shoats increased by a factor of 11 between 2000 and 2015. Further, according to the wealth rankings it would seem that in some PAs the amount of livestock per household has increased, together with crop production.

In Fasil Angesso for example, there appears to have been a substantial increase in the 'medium' wealth category (from 11% to 60%) in the period 2007-2016. And further, the criteria for the ranking are a higher number of livestock and crop production in 2016 than in 2007 – that is the 'medium' category was defined as having 10-15 cattle, 15-20 shoats, 4-5 equines and 2-3 ha of land in 2007, yet in 2016 it was defined as having 50 cattle, 25 shoats, 6 equines and 25 quintal of crop yield. Though there may be some discrepancies in these figures, it suggests overall that though crop farming has increased together with other pressures on land resulting in reduced grazing areas, this has had little effect on reducing livestock numbers and in fact the reverse has been seen, with a significant proportion of the population in the kebele becoming richer. It is suggested that this is because the residents of in this case Fasil Angesso still have alternative grazing options i.e. in particular the Sanetti Plateau, however if the BMNP does indeed restrict (even ban) grazing here, then this is likely to have a significantly negative impact on the Fasil Angesso livestock keepers.

In Hilassa PA, there is a different situation. Here, it is indicated that there has been little improvement in livelihood and poverty status, and it may to a degree have worsened. The wealth ranking suggests that the better-off/rich have been able to expand their holdings and production, yet the medium and poor groups have increased in size and yet have less assets. In 2007 the ranking showed that the community was 4% rich, 20% medium, 60% poor and 16% destitute. In 2016 it showed 10% rich, 70% medium and 20% poor, with the medium holding significantly less assets than they did in 2007. In all cases it was shown that the average quintals of grain produced per household per year had reduced – for the rich this had reduced from 50-100 quintals to 60, for the medium from 25-50 quintals to 12, and the poor from 10-15 to nothing. This suggests that crop productivity in the area is reducing.

A major problem for community members in Hilassa kebele is the low productivity and production of livestock due to feed shortages and the gaps in extension services (though the latter has improved). Some cross-breeds are being introduced, but are too expensive for many in the community. The increasing population will put further pressures on land available for livestock production. Because of the reduced lack of grazing, livestock keepers are forced to supplement livestock diets with crop residues and grass, often of poor quality. Livestock diseases that were not present before are now prevalent. Community members said that they need extension services and technological inputs to improve their livelihoods, including:

- improved forage, and forage preparation (machine)
- livestock health services for preventing disease, and a veterinary clinic in their kebele
- genetics – AI and/or better bull services (GOHI_FGD_01).

An interesting inclusion in the wealth rankings in Goba woreda in 2016 was the 'no. of children sent to school.' In Hilassa PA it was said that all the rich send their children to school, about 60% of the medium, and none of the poor. In Ashuta too, the sending of children to school was included, but here it was said that ALL wealth categories send their children to school. The holding of savings was also a new criteria included in the wealth ranking of Hilassa and Ashuta – with the rich in Ashuta saving up to 40,000Birr per year and the medium saving 15,000, and in Hilassa the rich only saving – 20-30,000Birr per year. Neither the going to school or the amount of savings were included in Fasil Angesso suggesting that these were of less importance and occurrence than in the other PAs.

The use of mineral springs and licks is still an important component of maintaining livestock health, though in some cases such as Ashuta and Hilassa livestock are not able to move out of the PAs to access them. Further some local mineral licks have been ploughed up for crop farming. As an alternative livestock keepers purchase salt (said to be soda from the Rift Valley Lakes), which is mixed with local soil and given to the livestock to feed on.

Community members in Fasil Angesso say that the solution to the situation is that the Park Administration should again allow them to graze their cattle in the Park for six months of the year, as they have been doing for generations. This allows them to grow crops undisturbed in their home areas whilst the livestock are away. One FGD said: "We consider the Park to also be our property and our responsibility, and we can also take care of the environment in the Park and prevent disturbance to and protect the wildlife. If the Park's Administration continues to force us from using the grazing area then there is no solution, and some community members will continue to try to use the grazing areas. This will have unfavorable consequences in future."

They also argued that the OFE should allow them to graze in the forest areas – “we can also take care of the trees for mutual benefit as well.” (GOFA_FGM_01).

Community members also mentioned family planning in order to curb the population growth. In addition, local land use planning is seen as a must in order to better plan land use priorities and to make best use of the land, its potential, and available natural resources.

Figure 3.4 Map of grazing areas in Harena Buluk woreda as described by respondents

4.0 HARENA BULUK WOREDA

4.1 Introduction

Harena Buluk was originally part of Mena Angetu woreda, together with Delo Mena. It was divided sometime between 2005-2007. The division saw around 90,000 hectares of forest being included in each new word. The forest is an important grazing resource although there is conflict between livestock grazers and those that grow coffee and increasingly crops. In 2016 the human population size was said to be 115,637, being 13,313 households with an average family size of 8.7. The woreda land size is 193,400 ha with many kebeles adjacent to the BMNP. Population density is 53/km sq. 70% of the woreda is mid-highland, 29% lowland and 1% highland. 35% of the woreda is said to be pastoralist, 54% agropastoralist, 6% crop farmers and 4% other. Cultivated land is said to be 7%, cultivable land 5%, grazing land 6%, forest 66%, bushland 12% and settlement 2%.[23]

In 2007 livestock was an important component of livelihoods systems, utilising the 90,000 hectares of forest areas found in the woreda. In Harena Buluk it was reported that 75 per cent of the population undertook both crop production and cattle rearing, 12 per cent grew only crops and 8 per cent keep only livestock. Pasture was reported to be 11.5 per cent of land cover at that time (Delo Mena and Harena Buluk Agricultural Development Offices undated).

According to the two available data sets (2000 and 2007) there has been a marked increase in the livestock holding. As the data from 2000 relates to Mena Angetu, the 2007 figures for Delo Mena and Harena Buluk have been aggregated to offer a comparison. In 2000 the livestock population was reported to be: cattle 145,850; shoats 33,939; equines 5,906; and camels 11,953, which equates to 121,281 TLU or 197,648 (see Appendix 1). By 2007 this had risen to: cattle 161,993; shoats 49,770; equines 14,275; and camels 23,690, which is equal to 151,341 TLU or 249,728 heads. This represented a 25 per cent increase in the overall livestock holding of the area between 2000 and 2007.

To compare these figures with 2015, again the figures for Harena Buluk and Delo Mena can be aggregated. This means that in what was Mena Angetu woreda (i.e. now split into Harena Buluk and Delo Mena) total livestock figures in 2015 were 723,269 heads of livestock made up of: 479,601 cattle, 160,731 shoats, 37,515 equines, 45,422 camels. This is a nearly 3-fold increase from 2007, and a 3.65-fold increase from 2000 with increases across all livestock types including cattle.

In Harena Buluk alone livestock numbers in 2007 totalled 95,319 heads, made up of: 59,669 cattle, 23,673 shoats, 7,863 equines, and 4,114 camels. In 2015 these had increased to 232,377 heads of livestock made up of: 156,975 cattle, 54,917 shoats, 19,735 equines, and 750 camels giving a 2.5-fold increase on total numbers and with cattle increasing nearly 3-fold, shoats and equines over 2-fold, and camels reducing significantly. The reason for the fall in camel numbers was not clear. Most surprising is the significant increase in cattle.

The only detailed description of livestock movements date to the mid-1970s (Ayele 1976: 23), which are worth quoting in full:

[23] Figures collected by Neville Slade, FZS in 2016 from the woreda administration offices.

"…stockowners move with their livestock to Haro Dibe in Gura Domole and forests of Arena during the bona months and during genna and hagaya to Berak situated between Welmal and Dumal Rivers. Stockowners migrate with their animals to look for water and to escape from livestock diseases which occur in the dry season. The furthest points stockowners go from the forests of Arena are as far as Sigoba, Wereba and Hanta. All of these areas are north of Hermecha in Berak. Stockowners from Berak do not come to the forests of Arena because it is too cold for livestock. Of the stockowners surveyed, 73.3% (11 stockowners) have migrated to grazing areas during bona and genna seasons."

Ayele (ibid) also describes a system of herd splitting, which is employed by stockowners with large herds who need to search for grazing land and earth salt (*haya*): *"The type of cattle that go to fora include steers, dry cows, immature and mature bulls. Werra livestock consists of milking cows, and at least one bull that goes with the herd. Fora cattle and camels go to Ida, Soma, and Sole (Genale), Golol, Bilal, Borena, Jirmu (Welmal), Oda (Oborso) and Dumal River in the dry* [season] *and to Gura Dumal Woreda, and Welabu in the rainy season."*

The price given for livestock was ox/bull – 5000ETB; fattened ox/bull – 10,000ETB; 5500 cow; 15,000 camel; 800 goat; 900 fattened sheep; donkey male 2500; and 70Birr for a chicken. One kg of honey sells for around 50 birr, and people mainly use traditional beehives. Crops grown include maize, sorghum, sesame, teff and mung bean. Erratic and inadequate rainfall make crop production difficult – in Sodu Welmal for example production is only 30% of what they plant/grow. Mungbean and sesame are cash crops – a farmer on average porduces 10 quintal per year. 70% of teff, maize and sorghum are used for home consumption. A quintal of sesame fetches 1500 Birr, mungbean 1700, teff 1800, maize 760. It was said that to date there are no investors in Harena Buluk.

In total throughout the woreda it was said that there were 23 land administration experts, 36 livestock experts, and 21 veterinary/animal health experts. Crop extension includes better sowing and soil conservation including application of fertiliser. Livestock extension focuses on vaccination and improving management. In the future the woreda plans to construct veterinary posts, water points, electricity for some settlements, mobile networks, expand extension services and enhance production and productivity of crop and livestock. In addition the woreda administration wants to improve relations with the BMNP, including permission to allow inhabitants to move with their cattle into the forest area during the dry season.

4.2 SODU WELMAL PA

Sodu Welmal is close to the Harena Forest. It is found in between the core Forest area and Delo Mena, south of the BMNP. It is an area that has experienced much political tension.[24] During Haile Selassie's time the major livelihood of the area was honey and pastoralism. Agriculture

[24] In 2007 respondents talked about the civil war that had taken place in the area between 1962-1969 called *Dhombira* (*Wero Wifa*). During this time the 'shifta' led by Wako Guto refused to give his land to the *hebasha* administration (Haile Selassie). A period followed called *Janadde* (1970-1973). During both of these periods respondents stated that there was no government administration at this time, and it proved to be a time of tension, cruelty and starvation for the pastoralist communities. The current period was described by the community as *Yadig* meaning 'freedom of the youth', illustrated by a cigarette packet – "they can smoke as they feel like"

was hardly practised and whoever cultivated was called '*fatfultu*' (meaning someone who brings bad luck) so not socially acceptable. There was said to be a low human population at *gomoji* (lowland dry areas) and in the forest areas. Grass and open grazing land was abundant, there was high livestock production and high honey production. To access grazing during *godantu* a tax of ETB4 per year was required from each household irrespective of the number of livestock. After payment one could settle anywhere. During the Dergue the area began to experience drought, population increased (though not unusually), agriculture started and honey production began to decline. The kebele structure was introduced and sometimes communities were asked to settle according to their PA (Flintan et al 2008). The resettlement of people from Haraghe here in the early 2000s has placed significant pressure on land and resources, and quickened the conversion of forest and grazing areas to agriculture.

Table 4.1 Wealth ranking 2007

Number of households: 187

Rich – *Duressa*	**Medium – *Waya Gobessa***	**Poor – *Hiyessa***
30-35 cattle	15-20 cattle	2-5 cattle
10-20 shoats	5-10 shoats	-
1 ha	0.5 ha	0.25ha
100 quintals coffee/year	50 quintals coffee	10 quintals coffee
14	52	121
7%	28%	65%

Table 4.2 Sodu Welmal wealth ranking 2016

Wealth category / **Criteria**	**Rich**	**Medium**	**Poor**
Coffee (quintal per year)	20	10	2
Crop (quintal per year)	20	10	2
Livestock*			
Cattle	30	15	5
Sheep	20	5	0
Goat	20	10	1
Horse	3	0	0
Mule	1	0	0
Donkey	1	1	0
Traditional hives	80	30	10
Transitional hives	20	2	0
Corrugated tin sheet	100%	60%	0
% of children attending school	40%	20%	10%
Savings	0	0	0
Total	10%	40%	50%

In 2007 the wealth ranking showed that 65% of the population were classified as poor and in 2016 50% of the population was classified as poor[25]. This suggests that there has been a reduction of poverty in the PA. However on closer inspection of the ranking the criteria used and the figures given suggest that the overall degree of poverty in the community may not have decreased much. For example in 2007 the poor category was categorised as having 2-5 cattle, 10 quintals of coffee, and 0.25 ha for crop growing (though quintal was not mentioned). In 2016 this had reduced to 5 cattle, 1 goat, 2 quintals of coffee, and 2 quintals of crops. Further whereas the medium category in 2007 held 15-20 cattle, 5-10 shoats, 0.5 ha land, and 50 quintal of coffee per year, in 2016 this had reduced to 15 cattle, 15 shoats, 10 quintal coffee, and 10 quintal crops. Further some sources of 'wealth' of the richest had also reduced with a dramatic drop in coffee production from 100 quintals to 20 quintals. This suggests that overall there has been a shift in income sources, but overall little reduction in poverty status.

It is also interesting to note that in 2007 the number of hives one owned was not included in the ranking criteria, though some respondents indicated that they did produce honey. In 2016 the numbers of hives owned were significant with 'rich' holding 80 traditional and 20 transitional hives; 'medium' holding 30 and 2; and poor holding 10 and 0 respectively. The ownership of hives was mentioned in the 2016 Trend Analysis below – where communities said that ten years ago people owned on average 40 hives, and today own 10.

In 2016 the number of children going to school in a household was used as criteria for wealth ranking. Only 10% of children from the poor category go to school, which is significantly lower than was found in other *kebele* that participated in this research.

Table 4.3 **Trend Analysis 2016**

	Before 10 years		**Currently**
Quantity of grazing land	●●●●● ●●●●		●
Area under crop production	●		●●●●● ●●●●
Time taken to access wet season grazing area	1hr		3hrs
Time taken to access dry season grazing area	2hrs		6hrs
Quantity of browse	●●●●● ●●●●●		●●
Rights for accessing grazing land	●●●●● ●●●		●
Types and number of livestock owned	Cattle	50	10
	Sheep	10	5
	Goat	50	10
	Donkey	1	1
	Chicken	5	7
	Hive	40	10
Conflict with wildlife	High		Low

[25] This exercise also overlapped with the 4th round PSNP where the community were assessed and categorized already. Even the local government structures were in favour of replicating the version they used for PSNP.

Time taken to access watering point	1hr	3hrs
Time taken to access mineral licks	Haya jigilcha (3hrs)	Haya jigilcha (5hrs)
	Haya urdee (4hrs)	Haya urdee (6hrs)
	Haya gurraacha (2.5hrs)	Haya gurraacha (5hrs)
	Haya diimaa (2hrs)	Haya diimaa (4hrs)
Time taken to access mineral springs during dry season	Hora werseessaa (4hrs) Hora bushooftuu (1hrs) Hora abiiree (5hrs) Hora dhoqqee (7%)	Hora werseessaa (4hrs) Hora bushooftuu (2hrs) Hora abiiree (2hrs) Hora dhoqqee (7%)
Income from livestock sale	●●●●● ●●●●	●●●
Income from animal product	●●●●● ●●●●	●
Time taken to collect fodder (for calves and sick animals	1hrs	4hrs
Vaccination	3 times/year	1 time/year
Spraying	0%	Yes some times
Production of animal feed	0%	Introduced with the settlers like feeding on leaves, sugar cane leaves and sweet potatoes (few individual)

Note: The community of Sodu Welmel were cautious about discussing the changes that had taken place over the last decade as most are related to the government resettlement program and over 50% of the participants in the exercises were settlers who did not favour the traditional way of life in the area. Therefore, the outcome of these exercises is overshadowed by the fear of the local community that was expressed.

In Haile Selassie's time the average household livestock holding was 120 animals, during the Dergue it was 70, and ten years ago it was 20 (though the wealth ranking in 2007 suggests that it is more like 30) (Flintan et al 2008). In the Trend Analysis undertaken in 2016 the perception of the community was that 10 years ago the average holding was over 100, which is clearly not the case. In addition the community today had the perception that 10 years ago there were large areas of grazing in the PA, however in the research study in 2007 community members stated that there was very little grazing area left then. Despite these inconsistencies the trends are clear – livestock holdings have reduced together with grazing land.

Although livestock is the mainstay of the community, community members tended to follow the settlers in ranking coffee and crop as dominant livelihood activities and reduce the number of the livestock holdings to a very minimum. The community related income from livestock to the amount of yield that they get rather than sale value. Usually they get a good yield in the wet season but the sale price is low. According the trend analysis, income generated from the sale of livestock and livestock products has significantly reduced from 10 years ago. This is not only due to reduced numbers of livestock held per household but also because of poorer quality of grazing available.

Some of the residents have kin and friends outside the *kebele* like in Malka Arba or Malka Amana where they keep their livestock. Currently there is a Pastoralist Commission office in the *kebele* administration but as the elders interviewed pointed out, there will soon be no need for it.

The area under crop production increased in coverage over the last ten years as compared to what it was before. Community members grow maize, beans, teff and wheat.

Although a significant portion of the harvest is consumed at home, considerable amount of crop is sold out in markets. For instance, the price (2016) of a quintal of teff; mung bean; sorghum; maize; and sesame was 1,800; 1,700; 600; 760; and 1,500 Ethiopian Birr respectively. The time taken to access both dry and wet season grazing over the due course of time has increased a lot making pastoralist mode of life difficult to sustain.

Both coffee and honey is grown/obtained from the forest area. Though significant reductions were seen in the comparison of the wealth ranking in the amount of coffee collected and sold, community members in 2016 did not indicate why this was so.

The resettlement of people from Haraghe in the early 2000s is associated with more intensive farming practices. Today it is said that half of the *kebele* population is from Haraghe. They are responsible for *chat/quat* now dominating the land with other crops pushing-out the local livestock based livelihoods. The settlers are very active and are purchasing land constantly from the local people. It is said that the number of chat/quat-chewers has grown significantly in the village, which is increasingly urbanising.

Climate and climate change

The seasonal calendar shows similar trends as other places in that there are more resources and greater livestock production in the rainy seasons, rather than the dry season. Labour demand is pretty consistent over the year with men carrying out more livestock-related tasks, and women carrying our more non-livestock related tasks. Diseases effecting livestock also differ across the seasons.

Table 4.4 Seasonal calendar

Seasons / Characteristics		Gana (March-May)	Bona (Dec-Feb)	Adoolesa (June-Aug)	Hagayya (Sep to Nov)
Rainfall		●●●● ●			●●●●●
Temperature		●●●	●●●●● ●●	●●●●●	●●
Wind		●●	●●●	●●●●	●
Frost		●	●●●●	●●	●●●
Grazing availability		●●●●● ●●●	●●●	●●●●●	●●●●● ●
Water availability		●●●●● ●●	●●	●●●●	●●●●● ●
Income from livestock		●●●●● ●●	●●	●●	●●●●● ●
Livestock yield		●●●●● ●●	●	●●●	●●●●●
Labour demand for livestock related activities	M	●●	●●	●●	●●
	F	●●●●● ●●●	●●●●● ●●●	●●●●● ●●●	●●●●● ●●●
Labour demand for non-		●●●●● ●●	●●●●● ●●	●●●●● ●●	●●●●● ●●

livestock related activities	M	●●●●●●●	●●●●●●●	●●●●●●●	●●●●●●●
	F	●●●	●●●	●●●	●●●
Incidence of cattle disease		• Tummaa • Jogsaa • Gagabsaa • Fillis • Titisa	• Dhibee biiraa • Dhibee aannan kukkutu	• Furtuu • Abbaa sangaa • Abbaa gorbaa	• Maansaa • Darabbaa • Dhibee saree
Animal feed		Grass (citaa), Leaves of maize	Crop residue, and straws	Grass and crop residue	Grass and maize leaves
Browse		Arabee, hombaa, mata qomaa, wayya boosa	Darguu, baal bunaa, baala hiddii, Arabee, hombaa, mata qomaa, wayya boosa	Arabee, hombaa, mata qomaa, wayya boosa,	Arabee, hombaa, mata qomaa, wayya boosa
Purchased animal feed		Not applicable as the community do not purchase feed, though some settlers do grow and purchase fodder.			

Grazing and grazing resources

In 2007 community members commented that there is very little grazing land left in the PA – today, there is even less. In 2007 it was said that it takes between 3-12 hours to reach wet season grazing; and during the dry season it took even longer – up to 15 hours meaning herders had to stay out with their livestock until 9pm at night. Interestingly the trend analysis states that today average time to reach dry season grazing is 6 hours and wet season 3 hours; which suggests that the areas accessed previously are no longer available and thus the grazing of the smaller number of livestock held are grazed closer to home. Having said that the respondents named a number of grazing areas that were also mentioned in 2007 (see below).

Today good wet season grazing is said to include *Sodu Welmal, Ardaa Xaddachaa, Cogee,* and *Wamachanna.* Not-so-good wet season grazing includes *Laku* and *Dagona* the areas lack sufficient grass and browse to feed the livestock; there is high rainfall and thick forest preventing undergrowth; wild animals like lion and hyena are also found there.[26]

Dry season grazing areas that are considered good include *Challicho* (meaning 'silent'), *Dimbicho, Dhimpuu, Mandhisa/Callalagaa,* and in Melka Erba[27]*.* Areas that are not so favourable include *Hodam* (invaded by weeds which harm livestock) and *Callalagaa* (not enough feed and also *dunlandhul* (leech) are found here which affects livestock). These grazing areas fall within

[26] In 2007 community members mentioned the following wet season grazing areas: Melka Arba (Kalido) to use mineral springs as Haya Urdae, Haya Karoo, Haya Gurrachie and Haya Jigelcha; Gara Erba; Melka Amana PA in Delo Mena; Berak PA in Delo Mena; Chiri; Hora Hadji; Tona; Worebu.

[27] In 2007 community members mentioned the following dry season grazing areas: *Dhimphu; Warsesa* mineral spring*; Chalicho (Hora Dhoqe)* good quality critical dry season grazing; and *chaffa* (along river bank close to home at Melka Arba). Also *Adeyi, Qoorama, Kakarsa, Bahdu Sodu, Dagona* forest areas, *Arabe* forest area*, Nyore,* and *Lada Dima.*

the Forest and the BMNP. They have heard that the BMNP authorities are going to prevent access to these areas.

In 2007 community members were using some fodder to supplement diets of livestock, particularly during the dry season. In addition sometimes sugar cane leaves were purchased and fed, which one respondent said cost him ETB100 per year (Flintan et al 2006). In 2016 the collection of fodder appears to have increased (see Trend Analysis and Seasonal Calender above), mainly from the forest including: *xoorsoo, xanaa, gagamaa, arabee, mataqoma, galee, gaguro* and *homba.*

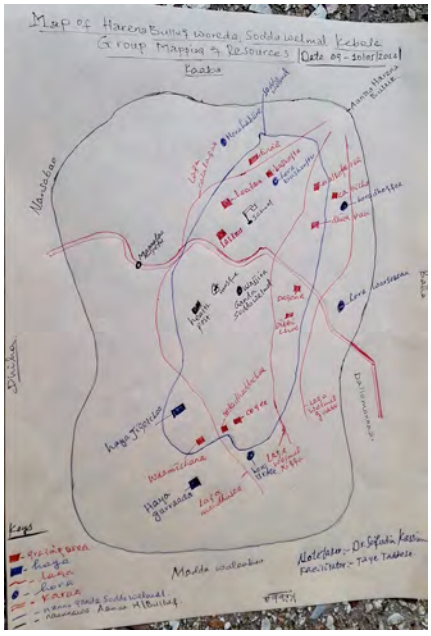
Livestock water sources and minerals

Sodu is surrounded by permanent rivers, which include Welaml Guda (big) and Welmal Xiqa (small), and Callalaqa[28]. The community is heavily reliant on the use of mineral springs when they move to the forest during the dry season, while mineral licks are used during the wet season. The majority of those mineral springs and licks that were mentioned in 2007 are also being used today (2016). In 2007 some herders would take their cattle to the mineral springs three times a day during the dry season.

The major mineral springs include:

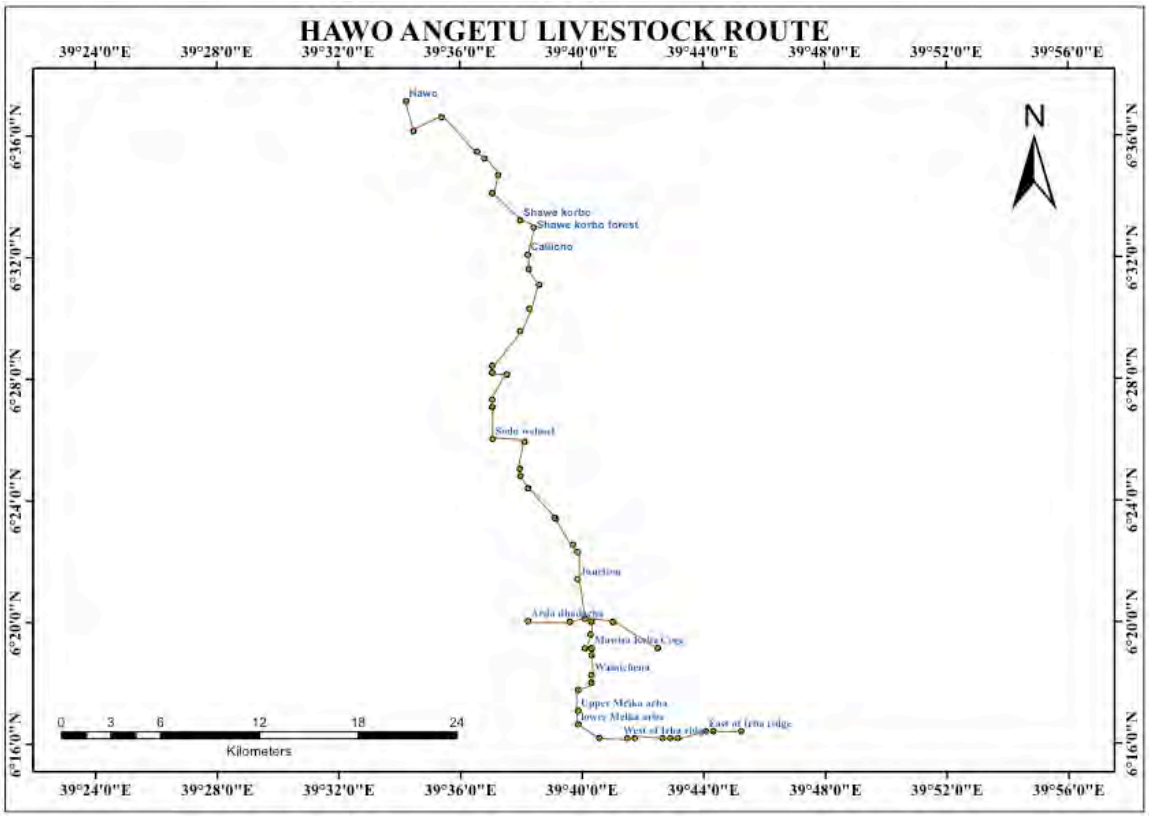
- Hora Dhoqee (also mentioned in 2007) near Chalicho in Hawo PA;
- Bushoftu
- Warseessa (also mentioned in 2007)
- Hambiree

Figure 4.1 Community resources and livestock routes in Sodu Welmal kebele



[28] In 2007 the rivers mentioned were Shawee and Ogoda during wet season; and the Woreba and Bishan Addii during the dry season.

Figure 4.2 Major livestock routes from/to Sodu Welmal



Major mineral licks include found in Melka Arba PA (all also mentioned in 2007):

- Haya Urde (found at Melka Arba)
- Haya Gurrachie
- Haya Jigelcha[29]

In 2007 the community also mentioned a special mineral spring at Mekana Gobdela, but this was not mentioned in 2016.

Time taken to some of the locations on the map(s): Sodu Welmal to Angetu= 1 hr; Sodu Welmal to Hora Dhoqqee= 4 hrs; Sodu Welmal to Hora Hambiree = 4 hrs; Sodu Welmal to Arda dhadacha = 3 hrs, Sodu Welmal to Jigelcha = 3:30 hrs; Sodu Welmal to Malka Arba = 4 hrs; Sodu Welmal to Hora Warsesa = 2:30hrs; Sodu Welmal to Malka Fara = 1 hr; Sodu Welmal to H/Bushoftu = 2 hrs; Sodu Welmal to Haya Urdee = 5 hrs , Sodu Welmal to Hodam = 1 hr, Sodu Welmal to Dina'a = 3 hrs; Sodu Welmal to Lakkuu = 30min; Sodu Welmal to Dagona = 15mins.

Livestock production, health and markets

Despite the challenges to livestock production in Sodu Welmal, animals appear to be well fed and comparatively healthy. As mentioned above, increasingly livestock herders are having to rely on supplementary feeding, but with the crop production in the area there are crop by-products readily available (though these may need to be purchased).

[29] In addition in 2007 *Haya Karro*, and *Haya Shilli* were mentioned.

Some of the major livestock disease found at Sodu Welmal in 2016 includes:

- *Furtu* (Anthrax)
- *Aba Gorba* (Black leg)
- *Botote* (Lumpy skin disease)
- *Maasaa* (Food and mouth disease)
- *Goondee*

In the PA, both crop and livestock extension services are available. The services provided include fertilizers, vaccination of livestock, and trainings in crop and livestock management.

Markets were not mentioned, but in 2007 these included Angetu, Melka Arba, Makane Gobelle, Hawo and Buluk.

4.3 MELKA ARBA

Melka Arba is about 30 kms from Sodu Welmal and Angetu (the woreda centre), and shares a similar history. The community at Melka Arba is mainly livestock keepers and unlike Sodu Welmal, the expansion of crop cultivation is less advanced though highly encroaching. The PA is found close to Harenna Forest.

Socio-economics and livelihoods

Table 4.5 Melka Arba wealth ranking 2007

Total no. of households: 286

Rich 'duressa'	Medium 'judgalessa'	Poor 'miskinoor hiyessa'
Cattle 30+	Cattle 10-20	Cattle 1-2
Camel 10+	Camel 3-5	-
Shoat 40+	Shoat 10-20	Shoat 1-4
Mule 2+	Mule 1	-
29	70	187
10%	24%	66%

Table 4.6 Melka Arba wealth ranking 2016[30]

Wealth category / Criteria	Duressa (Rich)	Jidu Galessa (Medium)	Hiyessa (Poor)
Livestock*			
• Cattle	40	20	5
• Sheep	10	3	-
• Goat	50	30	5
• Donkey	5	2	1
Crop			
• Sesame (quintal)	20	10	4

[30] Initially the community was uncomfortable about carrying out the ranking exercise as they were suspicious that they were being asked to do this for taxation purposes or to categorise them for the PSNP programe. Therefore, the team left the exercise until later in the day when people were feeling more comfortable.

• Other crop (quintal)	30	15	6
Corrugated tin roof (%age)	100%	80%	50%
Number of children attending school	60%	80%	50%
Percentage in each category	20%	50%	30%

***** The community did not include camels within the ranking even though it is known that camels are present. Wealthy pastoralists can own over five camels.

A comparison of the two wealth rankings 2007 and 2016 suggest that all wealth categories have reduced poverty and improved their livelihoods, which today include crop production as well as livestock. Not only have the wealth-defining criteria of the different categories increased for example in 2007 the 'poor' were defined as having 1-2 cattle and 1-4 shoat, whereas in 2016 they were defined as having 5 cattle, 6 shoats, 1 donkey, 4 quintals of sesame and 6 quintals of other crops; but also the number of poor decreased from 66% in 2007 to 30% in 2016 (the lowest %age in any PAs in this study) with an increase of 'medium' from 24% in 2007 to 50% in 2016, and 'rich' from 10% in 2007 to 20% in 2016. This suggests a significant improvement in the wealth status of the community as a whole (unlike the majority of the other PAs in this study).

In general crop growing is only for household consumption. However a few years back grazing lands were allocated to local investors (even some of the richer local farmers) to grow sesame (locally called *saleeti*). At that time the market for sesame was very good and an office was set up to manage the sale. However the price has since dropped, the office is closed and production has stopped. Yet the investors/farmers still hold onto the land even though they are not using it.

A good proportion of the children attend school in each wealth category. Though respondent said that 'rich' people with larger numbers of livestock have a high labour demand including for taking livestock to grazing, and therefore are reluctant to send their children to school as they can contribute their labour – hence the unexpectedly lower %age of children attending school in the 'rich' category.

Table 4.7: Trend Analysis

	Before 10 years		**Currently**
Quantity of grazing land	●●●●● ●●●●●		●●●●●
Area under crop production	●●●●●		●●●●● ●●●
Time taken to access wet season grazing area	2hrs		4hrs
Time taken to access dry season grazing area	1 day		< 3 days
Quantity of browse	●●●●● ●●●		●●●●●
Rights for accessing grazing land	●●●●● ●●●●		●●●●●
Types and number of livestock owned	Cattle	70	20-30
	Camel	10	1
	Goat	120	10

Conflict with wildlife	High	Low
Time taken to access watering point	1hr	4hrs
Time taken to access mineral licks	2 hours	4 hours
Time taken to access mineral springs during dry season	1 days	Over 3 days
Income from livestock sale	●●	●●●●● ●●
Livestock yield	●●●●● ●●●	●●●●● ●
Vaccination	●●	●●●●● ●

Climate and climate change

Table 4.8 Seasonal calendar

Seasons / Characteristics		Gana (March-May)	Bona (Dec-Feb)	Adoolesa (June-Aug)	Hagayya (Sep to Nov)
Rainfall		●●●●			●●
Temperature		●●●●● ●	●●●●● ●●●	●●●●● ●●●●	●●●●● ●●
Wind		●●●	●●●●●	●●●	●
Grazing availability		●●●●● ●	●●●	●●●●	●●●●
Water availability		●●●●● ●●●	●●	●●●●	●●●●●
Income from livestock		●●	●●●●● ●	●●●●● ●	●●●●
Livestock yield		●●●●● ●●●	●●	●●●	●●●●
Labour demand for livestock related activities*	M	●●	●●	●●●	●●●●
	F	●●●●● ●●●	●●●●● ●●●	●●●●● ●●●	●●●●● ●●●
Labour demand for non-livestock related activities	M	●●●●● ●●●	●●●●● ●●●	●●●●● ●●●	●●●●● ●●●
	F	●●	●●	●●	●●
Incidence of cattle disease		• *Abbaa sangaa* • *Darabbaa* • *Sombee re'ee*	• *Cittoo* • *Tummaa* • *Biiraa* • *Jogsa* • *Sombee re'ee*	• *Abbaa gorbaa* • *Maansaa* • *Galboo* • *Sombee re'ee*	• *Somba re'ee* • *Martoo re'ee* • *Furtuu* • *Abbaa gorbaa*
Types of livestock feed/fodder		• *Maayodii* • *Gacaa* • *Luucoo* • *Osolee* • *Asaree* • *Biiqqaa* • *Lugoo*	• *Grass (Daafa, sokora)* • *Hombaa* • *Dikee* • *Wayyabeessa* • *Arabee* • *Aaraa*	• *Baala biiqqaa* • *Baala harooressaa* • *Baala bir'eesa* • Crop residues	• Grass *(citaa)* • *Teff straw* • *Maayodii* • *Gacaa* • *Luucoo* • *Osolee* • *Asaree*

	• *Bir'eesa* • *Baala harooressaa* • *Dhigiri*	• *Onomaa*		• *Biiqqaa* • *Lugoo* • *Bir'eessa* • *Baala harooressaa* • *Dhigrii*

* Men scored labour of women high for livestock activities, as the men are increasingly shifting to focus on cultivation of cash crops i.e. non-livestock activities. It is increasingly role of women and children to look after livestock.

The community divided the year as did the community in Sodu Welmal (see above). The community stressed that rainfall is reducing year to year.

Livestock grazing and water

Melka Arba is a vast PA with lowlands where livelihoods were dominated by pastoralism. However this has been increasingly compromised by crop farming, a trend commencing in the Dergue time. Today, many grazing areas have been encroached by farming, given to investors (see above) and movement is challenged. In response community members move to neighbouring Berak PA for much of the wet season, and to the forests during the dry season.

During the wet season – *Ganna* – the livestock is taken to neighbouring Berak PA, where surface water and reasonable grazing attract large numbers of livestock. During the dry season – *Bona* – livestock grazes in Forest sites as below including many in Hawa PA. Following the dry season livestock is moved back to the *kebele* Melka Arba and grazes in different grazing areas there.

Table 4.9: Wet season grazing areas and other resources used by Melka Arba PA[31]

Wet season grazing areas found in Berak PA	**Characteristics**
Libee	Vast grassland, which is encroached by thorny bushes and shrubs, and woodlands. Best for wet season grazing when surface water is available for the livestock.
Kilkillee	
Hara Soomoo Harree	
Hara Geeransaa	
Xiilota	
Kalido	
Burgitu	

Many of the grazing areas used in Berak PA have been encroached with shrubs and thorny bushes. These are difficult for cattle to eat and digest, and so some livestock keepers have changed their livestock types to goats and camels who are better able to eat/browse these plants. The thorny bushes can scratch people and livestock as they pass.

[31] Wet season grazing areas mentioned in 2007 include *Berak* PA (best); *Chama*i for 3 months April-June; *Erba* Mountain; *Odda*; *Kalido* Mountain; *Tulu Wambelle* on way to Meda Welabu; *Gayyo* between April-June; and *Karro.*

In 2007 community members expressed concerns that the grazing in Berak was becoming heavily encroached, and some pastoralists had to move further to Delo Mena. In addition it was said that any 'open' grazing in Berak was being given to investors. In 2007 respondents said it took four days to reach Berak i.e. about the same time it takes today.

Livestock are grazed in the Harenna Forest during the dry season, where large open grasslands can be found in some areas. Favoured grazing sites are *Calicho* and *Hawoo.*

Table 4.10 Dry season grazing areas and other resources used by Melka Arba

Dry season grazing areas[32]	**Characteristics**
Hawoo	Mainly forest areas, but often wide open grasslands in the forest. Calicho and Hawoo are considered best grazing sites.
Calichoo	
Ogodo	
Qanqana	
Hachoo	
Riripha	
Insura	
Qaamukkoo	
Masagatte	
Hadaye	
Garawicho	
Xaaqoo	
Furme	
Gubalessa	
Gambicho	
Qumbi Horoo	Has been enclosed for watershed development

[32] In 2007 the following dry season grazing areas were mentioned: *Gara Wicho* (best grazing area) however agriculture encroaching and the government may restrict access as it is on the border of Goba and Nensebo woredas and the local administration does not want people moving around there; *Gara Fume* (forest area bordering Goba); *Alemgena (Qumko)* and *Adeyi* (next best grazing areas) (Hawo PA) but the PA residents (many settlers) are planting coffee there, and now conflict with grazers – fear that problems will spread to other dry season grazing areas too; *Masagate (Hora Gate)* Hawo PA*; Hora Dobo; Godubota; Hora Agam; Wana Sidrsa* to Meda Welabu District; *Dadme; Badessa; Garicho; Borale* (bordering Goba)*; Qumbi* (bordering Goba).

The time to reach grazing sites has doubled in some cases over the last ten years. This is due to the extensive crop cultivation that has taken over large parts of the *kebele.* Most of this crop farming is undertaken by settlers who were moved to the area 12-14 years ago from Haraghe. Crop cultivators harm livestock such as cutting them, when livestock eat crops on the way to grazing sites. Previously community members were able to rest and livestock graze on the way to the forest, but now they have to travel without stopping which puts a strain on both livestock and people. Most of these grazing areas are far from home and thus grazers must set up temporary camping sites from which to move locally.

Grazing areas where access has been recently lost include:

1. Konattu, which has been enclosed as a livestock ranch.
2. Kalidoo, Wanbera, which has been enclosed as a community *kalo.*
3. Qumbi Horoo, which has been enclosed for watershed development.

In 2007 the community expressed strong concerns that their grazing areas were being lost, and particularly due to change of land use to crops and coffee by the settlers still arriving from Haraghe and Shoa (through the government's resettlement programme). Conflicts were occurring between the settlers and pastoralists including pastoralists being chased out from Hawo PA. These conflicts appear to have continued if not increased today. One man in 2007 sadly expressed:

> *It used to take me four days to arrive at the dry season grazing site resting on my way at certain destinations as previously. However, now this year I spent eight and a half days just getting there since all the routes are cultivated and it is difficult to pass through. I fear that in the future that all the outlets will be closed and we might be chocked to death.*

Despite these concerns it would seem from the 2016 research that the community is able to access most of the sites that were used in 2007, even if some of these have been encroached. In 2007 it was said that it took 4-8 days to reach the dry season grazing areas. In 2016 it was suggested that ten years ago i.e. circa 2007 it took 4 hours to get to the dry season grazing areas suggesting that the perception of the past was more 'rosy' than it was in reality – and today, it takes more than 3 days. As such it would seem that the time taken to reach dry season grazing areas is roughly the same.

Water

In the wet season grazing areas water is sourced from surface ponds. Specific water sources in Melka Arba *kebele* include[33]:

[33] In 2007 community members said they mainly rely on the Didimoo, Welmar and Mandhisa rivers. Also they said when the visit the lowlands during the wet season they may face a shortage of water unless they reach the main river. And at Berak local people may prevent them from using water wells if water is scarce – it used to be given for free to everyone, but now the locals are restricting access. It was also said that Erba Mountain grazing area has no water, and it takes one full day to access the Bidimo river from there. (Flintan et al 2008).

- Laga Bidimo
- Mandhisa River
- Haroo Quucuu
- Burqitu
- Laga Dhigri (only during rainy season)
- Burqa Mio Qerensa

Figure 4.3 Map of Livestock Resources in Malka Arba, Harena Buluk

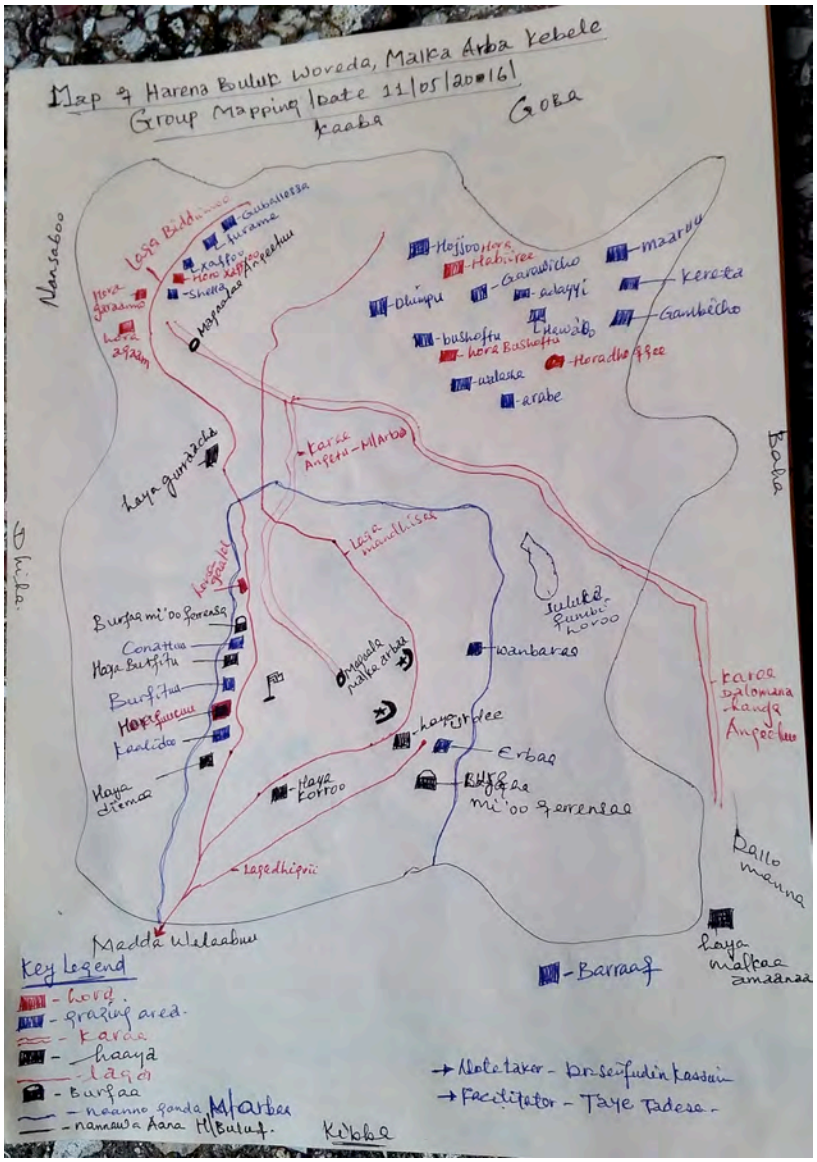
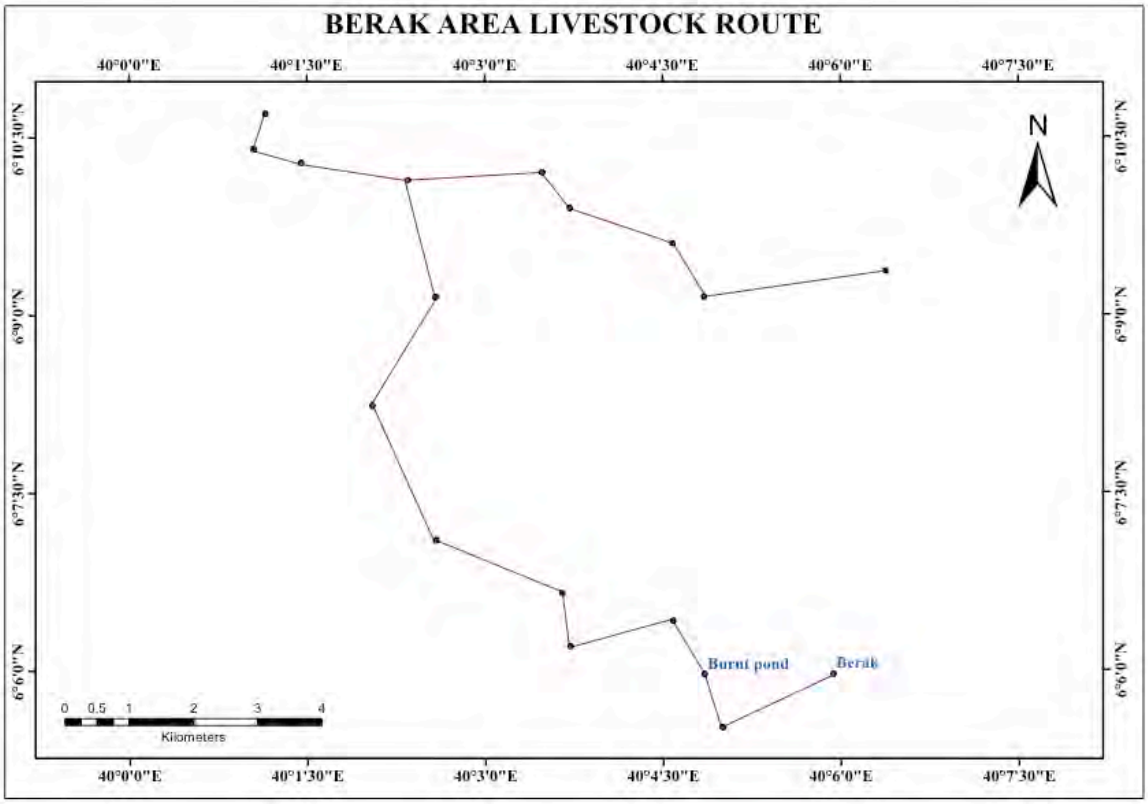


Figure 4.4 Livestock routes from Melka Arba to Berak



Minerals

Mineral licks found in the Harenna Buluk wet season grazing areas:

- *Haya Urde* (also mentioned in 2007 see below)
- *Haya Burqitu* (also mentioned in 2007)
- *Haya Karoo* (also mentioned in 2007)
- *Haya Sangooti*

Haya Malka Amana

- *Haya Gurachaa*
- *Haya Diima*

Haya Urde is very well known and people come from far away to use it. In 2007 it was said that previously livestock herders settled there during the rainy season for a month, but these days it is impossible to do that due to agricultural expansion. It is also not possible for livestock to feed at the site and minerals must be loaded up onto donkeys and mules or carried by humans to somewhere where the animals can feed. It was said that it used to take 1-2 hours to get there from the main settlement sites but now it takes 5-6 hours as agriculture has cut off livestock routes.[34]

[34] On visiting the site in 2007 it was clear that the site is shrinking under pressure from agricultural expansion. Even it is feared that potential *haya* ground may be cultivated in the near future.

Mineral springs found in the forests used in the drier seasons, include:

- *Hora Dhoqee* (mentioned in 2007)
- *Hora Bushoftu*
- *Hora Xaaqoo* (mentioned in 2007)
- *Hora Gaale* (mentioned in 2007)
- *Hora Farmo* (Gormo mentioned in 2007)
- *Hora Agaam Sooduu* (mentioned in 2007)
- *Hora Xaxaaxessa*

Fodder and feed

The feeding of fodder and feed is not practised here as much as it is in other *kebele.* In 2007 fodder was collected ('oda' leaves) and fed to calves, weak and lactating animals.

Livestock production, health and marketing

It was said that the average number of livestock per household is 30 including 2-4 draught animals that are used for about 30 days per year. This is the same average holding as was suggested in 2007. Cattle are sold at around 4 years old, sheep at 6 months, goats at 5 months and camels at around 3 years. Cows give around 2 litres per day, goats 0.5 litres and camels 4 litres. Community members said that most livestock keepers have local breeds – and there are few if any instances of cross-breeds. Though the community members mentioned camels in discussion, they were not mentioned in the wealth ranking (see above) – here the community also indicated that the average number of camels held by a household has decreased from 10 (ten years ago) to 1, which suggests that camel numbers have indeed declined.

Some diseases are associated with specific grazing areas – Berak is known to have a disease transmitted through dead tortoise bones that the livestock eat and for which there is no cure; and in Gabmichoo a plant called *gonde* is found which kills an animal that eats it.

Some of the disease that are found in the area include: *Gagabsa, Furtu* (Anthrax), Aba Gorba (black leg), *Borte* (lumpy skin disease), *Maasa* (foot and mouth disease), *Goondee, Citto* (Ectoparasite), Trypanosomiasis, *Kormamu* (Tumor).

Though the community complained that there was a lack of veterinary services in the *kebele* (see below), the trend analysis suggests that there has been a significant increase in the practice of vaccinating animals.

In 2007 it was said that hyena were a big problem regularly killing livestock, though it was not mentioned in 2016.

4.4 Synthesis and future scenarios

One of the key problems[35] identified by the community in Sodu Welmal and Melka Arba is that of animal health. The community said that this is due to a lack of attention by government and

[35] The Sodu Community raised two key problems, discussed on them and suggested solution. During this discussion, some of the *kebele* government were present preventing and/or creating an atmosphere of mistrust and fear which kept the community from feely speaking.

development actors, shrinking of grazing land from cultivation, population increase and settlement, which leads to further decrease in the land available for livestock. There is no livestock extension system in the area. And as a result the community struggles to manage the health of their livestock. Drugs that they purchase are out of date, ineffective and do not cure diseases.

A root cause of the situation was identified as weak policy on livestock, and if policy exists then weak implementation. The participants identified that appropriate animal health management is one of the areas that the responsible bodies need to pay attention to. In addition, they commented that the health issues is one issue but unless the grazing, the watering and the mineral access is improved and given attention, health management alone cannot solve the situation in the longer term. Though settlers suggested that improved breed and feed management was a solution, this was not welcomed by the local pastoralist or herders.

A second key problem is that there is conflict between crop producers and livestock keepers. This issue divided the discussion group in Sodu Welmal and created bad feelings as those present were part of such conflicts. However, those who raised this problem identified the causes to be weakness of the policy on land use which blindly favours crop production and settlement, population increase from within and settlement, shrinking of grazing land, cultivation of land blocking livestock movement routes to grazing areas, watering points and minerals. Again they did not shy away from putting all the blame on the government policy for lack of clear guidance and extension on livestock management and even on pastoralism. The community's solution was to respect and protect livestock routes, allocate cropland away from the grazing areas, improve the quality of the grazing land and improve livestock production. Local government has done little to address the problem and may have contributed to it. In a study on migration, Wakjira et al. showed that local administrators in Harena Buluk District purposefully encouraged inward migration and settlements in the forests and other natural vegetation areas to increase the population of the district.

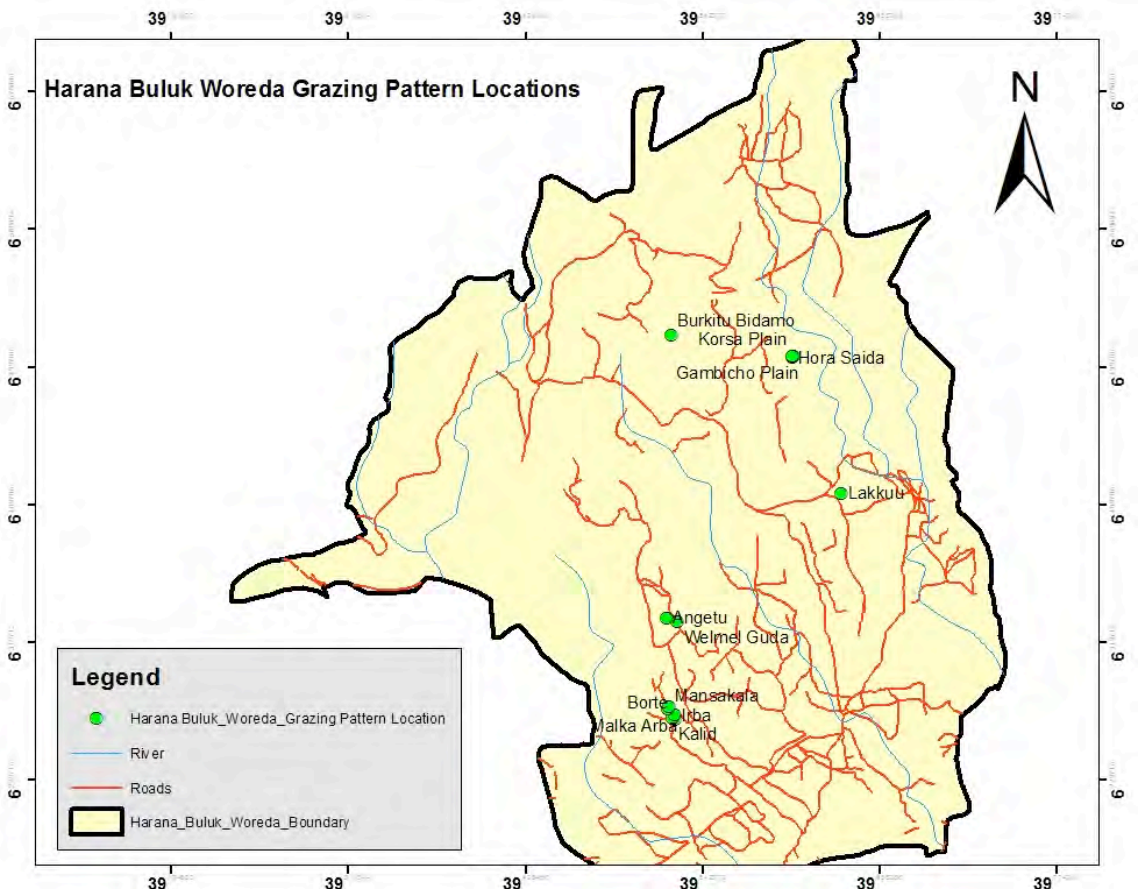
A similar problem was given in Mekla Arba who highlighted the shrinkage of the grazing area leading to feed shortage for livestock. The community said that this was caused by the expansion of crop cultivation due to shortage of livestock; and weak attention given to the livestock sector by government including livestock extension services (whereas extension services for crop farming have increased). They also said that government policy favours more intensive livestock production and reduced livestock numbers including the introduction of 'improved' breeds. This is already being taken up by the farmer/settlers from Haraghe. The local government office confirmed this. This is despite the fact that local community members want to strengthen their traditional livestock production systems, which they believe better make use of the climate and resources available.

Solutions provided for this latter problem by the community in Melka Arba include:

- Properly planning, managing and legalising the *kalo* system.
- Government should take back the land given to the investors/farmers for sesame production and that is no longer being used, and return this to the community for grazing.
- To integrate crop production with pastoralism in a more appropriate and friendly manner. The community underlined that they do not want to stop crop production

altogether, but rather, they want both. As such, they want to see more attention given to the livestock which is the backbone of their livelihoods. This would be through extension services and investments. The community strengthened their interest in this regard by saying:*" mana ayyaalle hinfeedha heerumalle hinfedha jette hintalli".* Literal translation being…"I want my mom's house and I also want to get married".

Figure 4.5 Map of grazing areas in Harena Buluk woreda as described by respondents



5.0 DELO MENA

As described above Delo Mena was originally part of Menu Angetu woreda together with Harena Buluk, until the two were split. As part of this split the 180,000 hectares of forest found in Menu Angetu were divided with 90,000 given to each woreda. As in Harena Buluk this forested area is a highly important dry season grazing area providing respite for livestock from the dry lowland areas in the dry season. In 2016 the woreda population was said to be 116,107 with 18,645 households with an average 6.2 per household. The woreda land size is 483,400, population distribution is 29 people/km sq, with significant numbers of kebele land bordering the Park (around 61%). The woreda is 15% highland, 64% mid-altitude and 21% lowland. 18% of population is pastoral; 45% agropastoral; 28% crop farmers; and 9% other. Cultivated land is 6%, cultivable land is 1%, grazing land is 19%, forest is 24%, bushland is 36% and settlement is 2%.[36]

Livestock numbers in Delo Mena have grown significantly since 2007 and before that from 2000. As described above in section 3, as the data from 2000 relates to Mena Angetu, the 2007 figures for Delo Mena and Harena Buluk have been aggregated to offer a comparison. In 2000 the livestock population was reported to be: cattle 145,850; shoats 33,939; equines 5,906; and camels 11,953, which equates to 121,281 TLU or 197,648 (see Appendix 1). By 2007 this had risen to: cattle 161,993; shoats 49,770; equines 14,275; and camels 23,690, which is equal to 151,341 TLU or 249,728 heads. This represented a 25 per cent increase in the overall livestock holding of the area between 2000 and 2007.

To compare these figures with 2015, again the figures for Harena Buluk and Delo Mena can be aggregated. This means that in what was Mena Angetu woreda (i.e. now split into Harena Buluk and Delo Mena) total livestock figures in 2015 were 723,269 heads of livestock made up of: 479,601 cattle, 160,731 shoats, 37,515 equines, 45,422 camels. This is a nearly 3-fold increase from 2007, and a 3.65-fold increase from 2000 with increases across all livestock types including cattle.

In Delo Mena alone, total numbers of livestock heads in 2007 was 154,409: this was made up of 102,324 cattle, 26,097 shoats, 6412 equines and 19,576 camels. In 2015 this had increased to total number of 490,892 heads, made up of 322,626 cattle, 105,814 shoats, 17,780 equines and 44,672 camels. This is a more than 3-fold increase (i.e. in eight years) with increases across all livestock types, including a more than 4-fold increase in shoats (mainly goats). This is very surprising considering the increased pressures on grazing, and the conversion of much land to crop farming.

5.1. Erba PA

Erba *kebele* is found close to the forest. The people in the PA depend largely on wild coffee harvest and due to little available grazing resources, livestock are taken elsewhere to graze and browse. Trends already established in 2007 of land increasingly being cultivated during the wet season, has continued meaning a reliance on grazing elsewhere during this time (particularly in Berak and Haya Odo PAs), however grazing here is being increasingly restricted.

[36] Figures collected by Neville Slade, FZS from the woreda administation office.

Socio-economics and livelihoods

Table 5.1 Erba PA wealth ranking in 2007
Total no. of households: 547

Rich – *duressa*	Medium - *jidugalessa*	Poor - *hiyessaa*	Destitute - *dhaba*
100+quintals coffee per year	30-50 quintals coffee per year	1-3 quintals coffee per year	1 quintal coffee per year
30+ cattle	15-20 cattle	-	-
2+ mules	1 mule	-	-
2+ donkeys	1 donkey	-	-
50-100 goats	10-20 goats	1-4 goats	2 goats
10-20 chickens	10-15 chickens	5-10 chickens	1-5 chickens
10-20 beehives	5-10 beehives	1-5 beehives	-
55+ quintals crops	10-25 quintals crops	6 quintals crops	2 quintals crops
11	67	211	-
4%	23%	73%	0

Table 5.2 Erba wealth ranking 2016 by women's group[37]

Criteria	Duressa (rich)	Jidu Galessa (medium)	Harka Qaleessa (poor)	Hiyyeessa (very poor)
Cattle	20-50	5-20	1-2	-
Coffee (quintals)	50-100[38]	25+	1-3	-
Crop (quintals)	150+	40+	1-5	-
Donkey	1-2	1	-	-
Mule	1	-	-	-
Goat	5-20	2-5	1	
Type of house	Corrugated aluminum roof	Hut	Hut	Hut
% of children attending school	100%	100%	100%	100%
Honey production (kg)	50+	20+	-	-
	10%	45%	35%	10%

Source: Male and female FGDs

The wealth ranking carried out in 2017 suggests that the local community has a well-diversified resource base, with livestock still featuring prominently. Comparing this wealth ranking with that facilitated in 2007 shows a slight reduction in the number of livestock owned, and surprisingly it would appear to the be number of goats that have reduced most. This contradicts the information provided at woreda level, which shows a 3-fold increase in livestock in Delo Mena as a whole. The amount of coffee collected appears to have reduced somewhat, though the women in their exercise suggested that some 'rich' households could collect over 300 quintals per year; and in addition honey production appears to have declined. On the other

[37] The wealth ranking here is a combination of the wealth rankings carried out by the separate women's group and men's group.
[38] Women said this could go up to 300 quintals. Also women mentioned 'fruit' but it is not sure what was meant by this and we guess that it means 'crop'.

hand there has been a significant increase in crop production, with the 'rich' category said to produce 150+ quintals of grain per year, and the 'medium' category producing 10-25 quintals, compared to 55+ and 10-25 quintals respectively in 2007.

Overall it would seem that the community in Erba PA has overall become a little wealthier, and on the basis that the wealth rankings are indeed correct, the 'rich' category has increased from 4% to 10%, the 'medium' category from 23% to 45%, and the 'poor' reduced from 73% to 35%. Though it would appear that the 'destitute' group has grown from 0 to 10%, this is in fact not true as in 2007 it was mentioned that the number of destitute was not shown in the wealth ranking as the list of community members from the PA office did not include them as they did not pay tax. The community members did say at the time that there were destitute in the village, but did not show them on the wealth ranking. – therefore there were at least some destitute even though the 2007 ranking shows 0.

An interesting phenomenon shared among all wealth groups in 2007 is access to education where regardless of economic background of households, children of school age attend school (DMER_FGD_01).

Table 5.3 Trend Analysis 2016

Characteristics	**Ten years ago**	**Present**
Grazing land	●●●● ●●●	●●●● ●
Crop land	●●●●	●●●● ●●●●
Time taken to access grazing (wet season)	One day	Two days
Time taken to access grazing(dry season)	Less than 30 minutes	Over 2 hours
Water availability(dry season)	30 minutes	30 minutes
Water availability (wet seas on)	Available at the grazing land	Available at the grazing land
Time taken to access mineral licks (wet season)	Available at the grazing area	Available at the grazing area
Income from livestock product*	●●●● ●●●●	●●●● ●
Time take to access mineral springs	Available at the dry season grazing areas	Available at the dry season grazing areas
Grass availability	●●●● ●●	●●●●
Browse availability	●●●●● ●●●●	●●●● ●●
Right to access grazing land	●●●●● ●●●●●	●●●●
Types of animal owned	Same	Same
Quantity of livestock owned	●●●● ●●●	●●●
Income from livestock*	●●●● ●●●●	●●●● ●
Time taken to access fodder	Less than 30 minutes	Over 4 hours

Notes: *The community discussed at some length the issue of 'income' – at first they said that their income now is much more than it was ten years ago, but then they added that because the price of good purchased had increased so much this income did in fact purchase less. The community then agreed to show the significant reduction in income because of this i.e. reflecting reduced spending power.

The trend analysis also illustrates the gradual move from a livestock and forest product livelihood-based system (coffee, honey) to a more diversified one including crops. This diversification seems to be working well for the community. However community members complain that though growing crops is of benefit, it is increasing at a rate that is difficult to control and they would like to see measures taken to ensure that crop farming does not further compromise the livestock production system.

Table 5.4 Seasonal calendar

Seasons / Characteristics		Gana (March-May)	Bona (Dec-Feb)	Adoolesa (June-Aug)	Hagayya (Sep to Nov)
Rainfall		●●●● ●●		●	●●●
Temperature		●	●●●● ●●●●	●●●●	●●
Wind		●●●	●●●● ●●●	●●●● ●	●●●
Grazing availability		●●●● ●●●	●●●●● ●●●●●	●●●● ●●	●●●● ●●●
Water availability		●●●●	●●●●● ●●●●	●●●●● ●●●●	●●●●
Income from livestock sale		●●●●	●●●● ●●	●●●● ●●●●	
Income from livestock product		●●●● ●	●●●●● ●●●●●	●●●● ●	●●●●● ●●
Quantity of livestock products		●●●● ●●●●		●●● ●●●	●●●● ●●●
Labour demand for livestock related activities	M	●●●● ●●●●	●●●●	●●●	●●●● ●●●●
	F	●●●● ●●	●●●● ●	●●●●	●●●● ●●
Labour demand for non-livestock related activities	M	●●●●● ●●●●●	●●●● ●●●●	●●●●● ●●●●	●●●●● ●●●●●
	F	●●●● ●●●●	●●●● ●●	●●●● ●●●	●●●● ●●●●
Incidence of disease		●●●●	●●●	●●●● ●●●●	●●●● ●●

Source: Male and female focus group discussions (DMER_FGM_01 and DMER_FGF_01)

In terms of labour men dominate livestock production. Women also contribute through such as calf management, animal health management, preparation of food for herders – however men would not give these activities the same degree of importance as those activities carried out by themselves. During *Bona* it is considered easy work to take the animals to the forest area, guarding the animals against wild animals and theft. The men considered *Ganna* (the wet season) to be the most labour intensive when they said that there is no rest due to cultivation activities. Women also work hard during G*anna*, responsible for weeding and feeding the male work parties, and often work into the night – however, again, male respondents gave little value to this contribution.

Grazing resources

To date, Erba *kebele* has always had excellent dry season grazing in forest/wooded areas – livestock are moved there to escape the sun/heat particularly in the lowland areas for 3-6

months. However during the wet season nearly all livestock are moved out of the PA to Berak and Nanega Deehra not only to avoid the crops then being grown in Erba, but also to give the grazing in Erba a rest.

Daroo is one of the best dry season sites in Erba and is surrounded by forest. Special grasses locally called *maaxa/gaguro* and *gamagne* are found there. Most other grazing areas are forested with grasses called *daafa(cita), gale, homba, hamoca, wayaboosa, xoorso* and *diki* growing under tress/bushes. There are also other grazing areas of poorer quality mainly found in wooded areas, and/or where access is restricted due to steep terrain of the area.

In 2007, community members mentioned a long list of grazing areas, the majority in forest/wooded areas (see below). It is understood that the majority of these are still available but their access may be more restricted due to land use pressures and reduced quality (excessive use). Grazing and browse tends to be better the deeper into the forest one goes. Herders tend to make a cluster of temporay huts as a base – this is encouraged by the PA administration in order to limit damage to the forest (fire, cutting, illegal hunting). Herders are expected to be responsible for the area where they settle with the livestock. Herders tend to move in a group (neighbours and/or relatives), and are often made up of youth (aged 8-14).

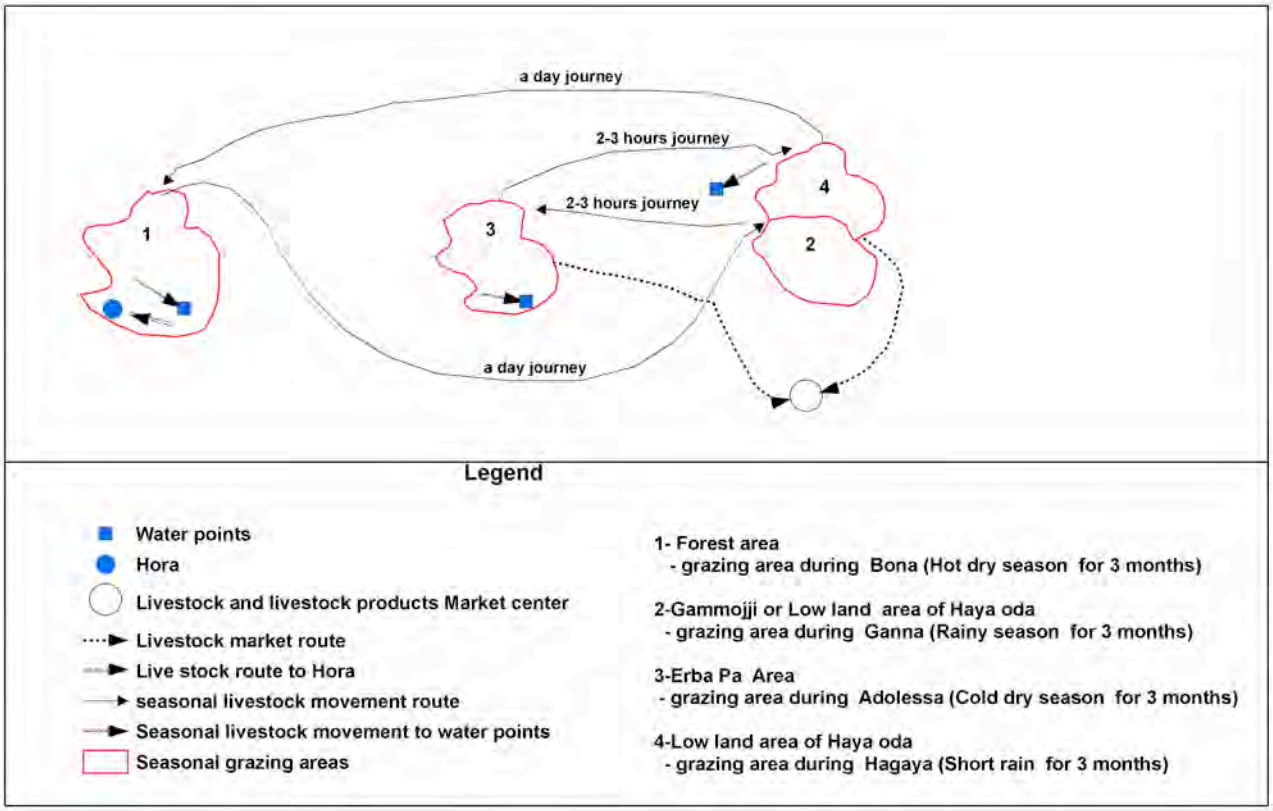
In 2007 particularly popular sites were *Arda jaldessa/Aalge; Qarssa Kurkuru; Daroo; Awajiro/Jirru; Qanqicho; Borte; Melka Qarsa; Abuubb/Habubi;* and *Adami* (though this last one was considered poor quality through close to home). In 2007 it was said that several browse species had disappered including *remoo, jojotta* and *luchee.* Some respodents mentioned using *kalo* (or grazing reserves). One site was mentioned as having a parasite called *ulaanul/ulaandula* – that is a site called *Qundhi*, and in 2016 other sites were mentioned as having this parasite (i.e. that in 2007 were not mentioned as having it), including Wandesa and Hoitu. This suggests that this is a growing problem and appears to be occurring in those sites where there is more farming taking place.

Though it is important for cattle to move to the cooler environment of the forest during the dry season, the goats would happily browse around the settlement. However because the two are normally grazed together, the goats are taken with the cattle to the forest. This is usually done by the men (perhaps with one wife) while his (other) wife is left at the homestead looking after young, weak and lactating cows.

Table 5.5 provides a summary of dry season grazing areas used by the Erba community FGDs in 2016, and mapped in Figures 5.1[39]

[39] In 2007 respondents mentioned a long list of dry season grazing areas – it is understood that in 2016 the majority of these are still available, but with increasingly greater restrictions including from other land uses and reduced quality: *Arda jaldessa /Aalge* (forest area); *Qarsaa Kurkuru* (good quality); *Qarssa Harre* (good quality) (GPS 37 N0S94229/UTM0716607); *Qarssa Hidi; Gargara; Zilo; Chafa Dheera; Daroo* (popular)*; Gora Qalo; Tarba Roofu; Dola Boru; O'Etu; Awajiro/Jirru* (forest area in southern part of BMNP) (popular); *Boyi Elema Arda tarre* (45 minutes from Dirra, bordering Haya Oda PA with some restrictions due to avocado farm); *Lemman* (steep and difficult to access); *Qanqicho* (good quality, good quantity, protection from sun – forest area increasingly seeing commercial plantations restricting access); *Erba Goga* (onward from Wadesa); *Abuubb/Habubi* (onward from Wadesa and Erba Goga, approximately 4 hours from Erba PA); *Borte* (forest area) (popular); *Melka Qarsa; Adami* (poor grazing but close to home);

igure 5.1 Rotational grazing of livestock around Erba PA, Delo Mena (2007)



Qundhi (less preferred due to parasite called *ulaanul*); *Arda jaldessa.* Other grazing areas mentioned which are thought to be dry seaon are: *Denda, Ado Huka,* and *Helgol Quoji.*

Table 5.5 Dry season grazing areas in Erba PA	
Dry season grazing areas	**Characteristics**
Daroo	6 hours travel from the PA center to the north bordering Goba *woreda.*
Qarsaa Kurkuru	Top quality grassland surrounded by forest and woodland. Preferred by all the PA herders. Grass type: *maaxa/gagaro* and *gamagne* Now the grazing area falls in the gazetted boundary of the Bale Mountain National Park.
Awajira	Woodland grazing areas. Ranges from 3-5 hours from the PA centre. Fodder type is similar across the whole woodland but of varying quantity, including: • *Daafa* • *Gaallee* • *Homba* • *Hamoocaa* • *Wayyabessa* • *Xoorsoo* • *Diki* Community members have heard that these woodlands also now fall within the gazetted boundary of the BMNP.
Gargara	
Korjoo	
Hanje	
Haaxa- Qallee	
Mata-gooba	
Hora higana	
Tarba raafuu	
Borte/Dala baru	
Wadessa	These woodlands are near to the PA centre with low quality grazing and browse, and potential for conflict with other land users including coffee growers. The woodland falls partially in both the Oromiya Forest Enterprise area and BMNP. The distance ranges between 1-3 hours from their PA centre. Wadessa is particular not so good since there is a parasite called *ulandhulaa* found there.
Adami	
Siisa	
Hoitu	This woodland falls in the Forest Enterprise area with poor grazing resources as it is very near to their settlement. Hoitu is also infested with *ulandhulaa.*

In 2016 the majority of dry season grazing areas still used by Erba PA livestock keepers are found either within the BMNP or within the boundaries of the Oromia Forest and Wildlife Enterprise area. The latter has increased in authority over the last ten years (see Box 3.1). With this increasing authority and reach, together with threats from the BMNP authorities to prevent all access of livestock to the national park, the Erba community is extremely concerned that they will lose access to most of the dry season grazing areas, which will make their livelihood impossible to maintain. As a result they fear destitution.

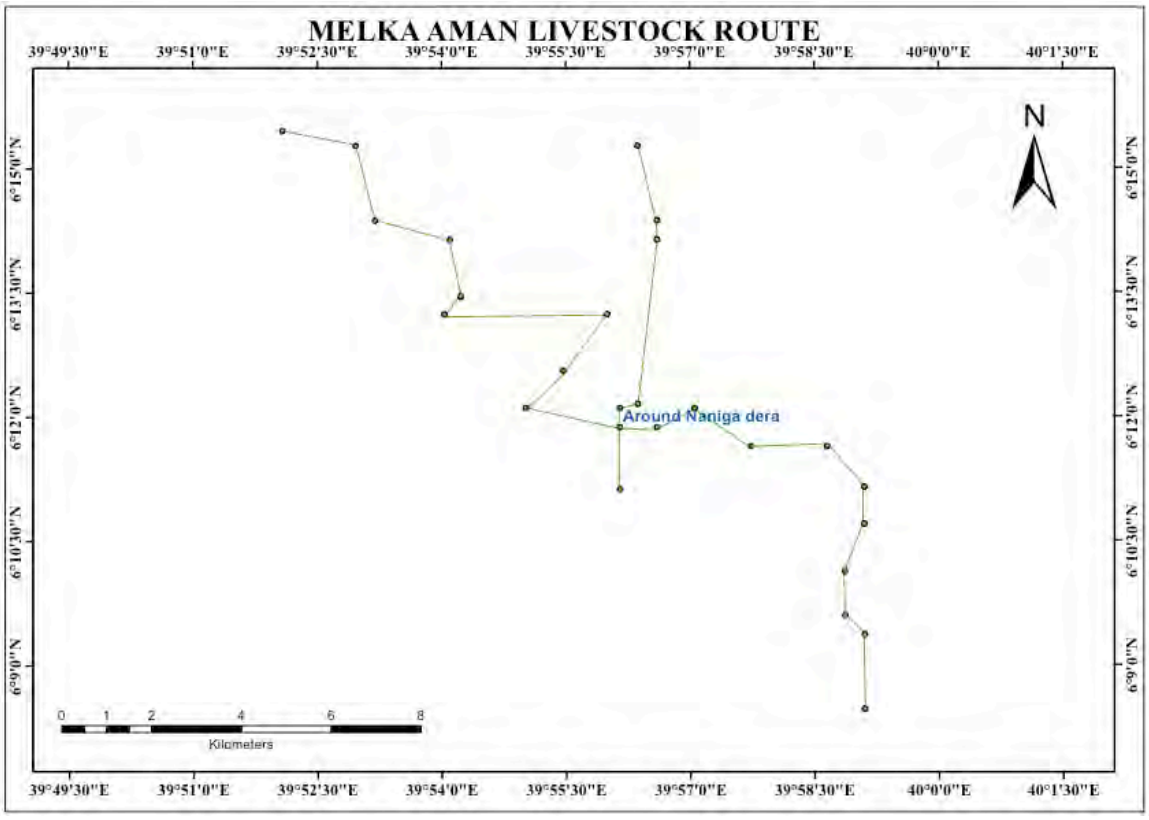
In the wet season the majority of livestock are moved out of Erba PA and taken to the lower lands in Berak. The livestock and their herders will stay here throughout the long rains. Some will stay longer while others may move back for the *Adolessa* or cold dry season returning during *hagaya* (or the short rains) i.e. visiting the area twice for roughly three months each (see Figure 5.1) Livestock are moved out of Erba PA in the wet season for several reasons – one, because cultivation of crops takes place, two to avoid the damp and cold and resulting sicknesses/disease, to make the most of the good wet season grazing in Berak that is preferred by the cattle and results in high milk production.

Table 5.6 Wet season grazing areas used by Erba PA[40]

Wet season grazing areas used by Erba PA	
1. Wet season grazing areas found in Berak PA	**Characteristics**
Dima Sole	Vast grassland, which is encroached by thorny bushes and shrubs, and woodlands. Best for wet season grazing when surface water is available for the livestock.
Qeremsa	
Waqdabare	
Qanqana	
Hara Galbo	
Dhugicha	
Bururi	
Sadeta	
Hunduko	Already given to investors so no longer available for use
Koticha Jema	
Kilkile/Basaqu	
2. Wet season grazing found in Nanega Dheera PA (on way to Berak)	**Characteristics**
Hurufa	Vast grassland mixed with bushes and woodland
Gogowe	

[40] In 2007 the following wet season grazing areas were mentioned: *Odo Bilawa* (Haya Odo PA or Berak PA) critical wet season grazing takes one day to reach, can be short of water (very popular) – to get there travel through Haya Odo and graze there on the way though an alternative route is through Gogee and Hermecha; *Haya Odo; Basaqu/Basaku* (popular); *Handuko* (Haya Odo PA) takes one day to reach, can be short of water but critical and rich wet season grazing (popular); *Qute* (Haya Odo PA) however increased settlement so grazing difficult; *Cirree* (Haya Odo PA); *Sadeta* (Berak PA); *Libe* (Berak); *Waqdabar* (Berak); *Hora Gobana* (Berak); *Hora Qarsa* (Berak); *Dhogicha* (Berak); *Hagola Sire* (Berak); *Barfota* (Berak); *Qeranso* (Berak); *Dima Sole* (Berak); *Gogwe* (Nanega Dheera PA); *Hurufa* (Nanega Dheera PA).

Figure 5.2: Grazing around Nanega Dheera



In the wet season herds from Erba PA as well as from many other neighbouring *kebele*[41] move to and congregate in Berak *kebele*. Though Berak's residents have traditionally provided for this sharing of the *kebele*'s grazing resources, they are increasingly becoming less tolerant and many residents as recently established cooperatives have started to enclose the grazing with fences. These cooperatives are now trying to prevent non-cooperative members from using the grazing in which they have invested time and resources, and/or are charging for the right to grazing in the enclosure. Most recently the grazing areas of *Saardetta Caamsa* and *Gogowe* in Berak were enclosed, and their use by the Erba community (and other outsiders) prohibited. They also said that members of the Berak community had burned their temporary houses. This is a new and disturbing trend for the Erba community and one that they have complained about to the *woreda* administration, but with no response to date.

Though this protection of grazing resources may be well-intentioned by Berak residents (and FARM Africa/SOS Sahel who have supported the process) in order to better manage their own resources, Berak livestock owners still move to the forested higher-altitude areas with their livestock in the dry season and use the resources of other communities, following the traditional *godantu* system. As such though they are increasingly refusing to share their own resources they are still expecting to use those of others. Berak community members said that the hospitality of those communities in the forest is becoming increasingly hostile and that these communities

[41] Including Wabero, Haya Oda, Burgitu, Dhirri, Waltaee Gudina, Gongowe, Mala Amana, Kale Golbe, Bobiya, Oda Dima and Deyu *kebeles.*

were responsible for burning some of their own temporary during the *godantu* migrations up to higher areas this year.

A second pressure on the grazing lands in Berak (as mentioned by Erba community members) is due to local government (woreda level Land Administration and Investment Office[42]) allocating grazing lands (including high quality grazing areas) to investors for crop agriculture (examples given were Hunduko and Koticha Jema) – undertaken without consultation of local communities (primary or secondary users). In addition, local government does not control the investors – many of whom cultivate more land than they have been allocated/leased (often double). Land for crop growing is given to those that have influence with local government officials. The increase in land allocated to crop farming not only removes the grazing land from the livestock production system, but also often blocks access to water sources or other grazing areas. In order to protect these lands for grazing, Berak residents see little other choice than to enclose them. Despite complaints to *woreda* officials about these allocations, the *woreda* continues to prioritise crop agriculture over livestock production despite livestock being the backbone of the local communities. This is discussed further below.

The increased conversion of grazing areas to agriculture means that it now takes double the time to get to the wet season sites than it did ten years ago, according to respondents. And with increased pressures on the wet season grazing areas, communities are forced to move more quickly to the dry season ones once ponds in Berak have dried up – putting added stress on these. Previously communities would take a month to move from Berak to the forested dry season grazing stopping to graze and browse along the way, but now all this grazing between the two has been lost to agriculture.

Access to grazing areas has become a critical issue for the community – who were outspoken in their complaints and concerns. Though grazing is an issue in both dry and wet seasons, it is in the wet season where tensions over access to grazing are of greatest concern. Erba *kebele* provides dry season grazing for many communities in neighbouring *kebeles* including Berak. This is mainly in the forested areas, which provide shade and a cooler environment during the dry months. Where these grazing areas fall under the expanding Oromiya Forest Enterprise areas, the Erba communities have been organised into forest user groups, which amongst other things is responsible for controlling access to dry season grazing areas. Bylaws provide the governance framework for management and use. When asked what was the difference between this system and the rangeland/livestock cooperatives of Berak (described in more detail below) community members responded that their bylaws do not effect the *godantu* system for anyone – they do not stop anyone grazing in these areas – and though in future they anticipate charging fees for grazing they have not started doing this yet. In addition, residents of Berak and other *kebele* freely use the forest for collection of non-timber forest products. Community members stressed that if Berak did indeed prevent them from using the wet season grazing found there, then they in turn would refuse Berak livestock keepers access to Erba grazing areas. They believed that this would lead to conflict between the two communities who in the past had shared resources peacefully (DMER_FGM_01).

[42] The woreda and zone assess and decide on potential lands for different investment and submit to higher authorities (region) to invite potential investors to apply. Community is not included in the decisions about use of land for investment.

Figure 5.3 Resource map of Erba PA produced by male FGD (DMER_FGM_01)

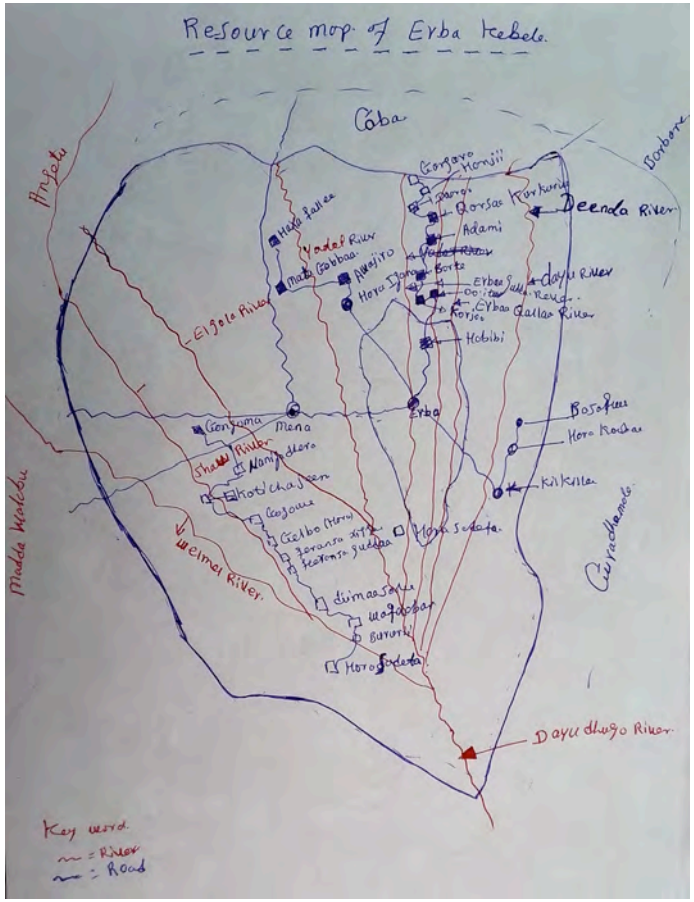
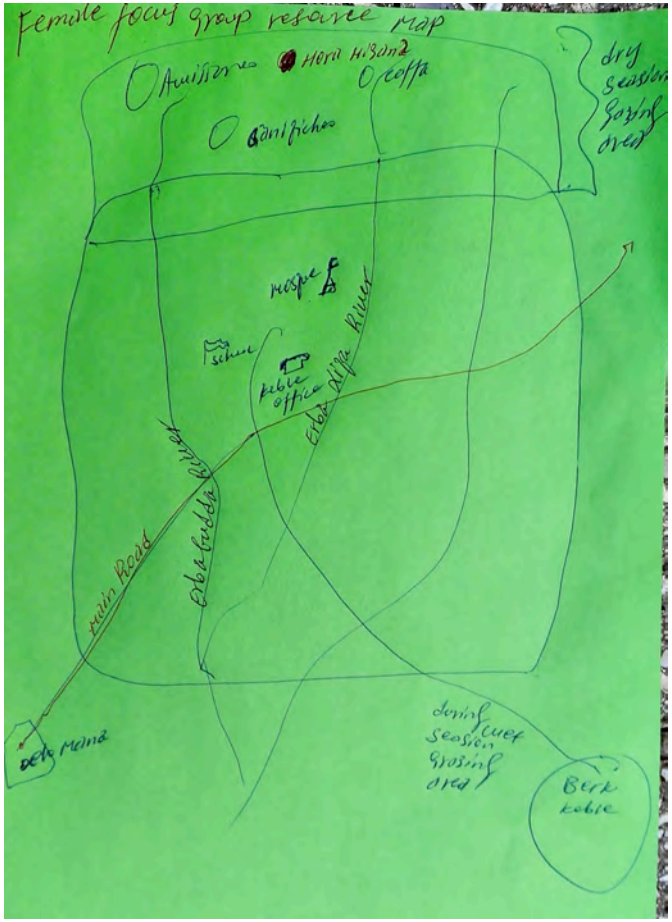


Figure 5.4 Resource map of Erba PA produced by female FGD (DMER_FGF_01)



Of additional concern (and flagged by communities as being most serious) is the loss of access to grazing areas in Erba *kebele* itself. This is due to the current demarcation of the recently gazetted boundaries of the BMNP (see Section 1.2). This is a very 'hot' issue with community members vigorously complaining about the recent decisions made by the Park and particularly about its boundary demarcation, which now encompasses many of their traditional grazing areas. This, they say has completely gone against what was agreed previously with Park staff. Community members said that when the recent round of discussions had started about the Park boundaries, they had been involved, and conclusions reached left them with the understanding that they would still be able to use the grazing areas that they have been using for decades. However now, they have heard that they will not be able to use any of these areas – and even that week they had heard that they would not able to use the forest at all. With the additional pressures on their grazing resources as described above, the Erba communities feel they are reaching a crisis point, that could very possibly lead to violent conflict and significant problems for their future well-being. They said that those working to protect the BMNP were working against them and trying to destroy their livelihoods completely.[43]

The expansion of the Oromia Forest and Wildlife Enterprise areas is a further threat – but at least here the community is given the opportunity to co-manage the forest and to use resources, albeit under a greater degree for restriction and control. Many of the community are members of forest user cooperatives, which have been established by the Enterprise to manage forest resources including grazing.

Not only has the amount of grazing reduced, but also the quality. The community described how previously they had used fire to control bush encroachment but the use of fire had been banned by local government officials. Now grazing areas have been overtaken by bush and scrubby-woodland.

Supplementary feeding of livestock

Community members interviewed said that in order to supplement grazing and browse, crop residues are fed to livestock (DMER_KIM_01) i.e. after harvest. In addition women collect *haroressa, dhigri, ule gaaluu* and *bire luko* during the wet season to feed to weak and lactating animals remaining around the homestead whilst the other livestock move to wet season grazing areas (DMER_KIM_01). In 2007 it was mentioned that women collected 1-2 backloads of fodder per day when needed. Some fodder/browse species that were said to have disappeared in 2007 include *rermoo, jajatta* and *luchee* (Flintan et al 2008).

Livestock water resources

The community is well-endowed with water resources including rivers that flow throughout the year and permanent springs. These include Hoitu, Deyu, Mulka, Wadessa, Calcali, Dimbe, Hidi, Sisa and Usho[44] rivers surrounding the grazing sites in the forest. However, increased

[43] The lead researcher facilitating this discussion expressed his concern that the community is very angry about the situation, which is very tense and close to breaking point. He felt that there is a strong possibility of the community turning to violence unless something is done to resolve the situation.

[44] Dry season rivers mentioned in 2007 include; Erba Qala, Erba Guda, Denda, Irba Tuma, O'tu, Barcuma and Hengeso, Micha and Dimbe found in upper mountain area. Most of these are different to those

agricultural encroachment of livestock routes and grazing areas is preventing livestock moving to the rivers and other watering points. In addition *dhulandula* are found in several of the rivers and which attack livestock when drinking. Wadessa River, close to Erba village has the most abundant prevalence of *dhulandula.*

In Berak during the rainy season water is abundant in surface ponds (called *hara*)[45]. In 2007 it was said that the government had developed many of these. However once the rains slow down, these quickly dry up and then livestock and their keepers are forced to move back to their own villages despite grazing still being available there. Livestock is then grazed around the homesteads during the months of May/June - August. In *Hagayaa* (November to December) livestock is again moved to Berak as rains fill up the ponds, and from there, livestock are moved after about two months to the dry season grazing areas in the forest. As above, access to Berak is becoming increasingly challenging.

Livestock mineral/salt springs *(hora)* and licks *(haya)*

Hora Higana is the main mineral spring used by livestock in Erba *kebele*. However, the cattle trough is broken here, which makes it difficult to access the spring. When there is good grass the livestock are taken to *Hora* weekly and graze around the site for some time: alternatively, livestock are taken there every two months including in the dry season. During *Adolessa* when livestock is mainly kept around the settlement, visits to *hora* are infrequent and rather, livestock are given additional feed to keep them healthy. There is one *hora* (Hora Qaba Caama*)* found on the way to Berak in Naniga Dheera PA[46]. In Berak PA there are no mineral springs, and instead when livestock are taken here in the wet season they use the mineral licks *haya* that are found there. There are also several licks found on the way there. The main mineral licks used by livestock from Erba PA are[47]:

- Haya Oda (found at Oda *kebele*)
- Haya Gafarsa (found at Gogowe grazing area in Naniga Dheera *kebele* on the way to Berak)
- Haya Dambala (found at Kale Golba *kebele* on the way to Berak)

And in Berak:

- Haya Dima Sole
- Haya Galbo
- Haya Hara Bargage
- Haya Dima Jirime
- Haya Sadeta
- Haya Hara Gobena
- Haya Balade

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mentioned in 2016, and it is anticipated that this is because th e repondents are talking about small tributaries with different local names rather than major rivers.

[45] Surface ponds (or *hara*) found in Berak during rainy season include: *Hara*s Galbo, Saiida, Qeremsa Qallaa, Qeremsa Gudaa, Baree, Dima Soolee, Balade, Waqdabar, Bargage, Dima Jirime, Dhugicha (the only temporary spring), Sadeta, Gobena, Qaba Soomoo, Qaraasi, Gurra, Qaba Hereri/humfis; and in Kale Golba *kebele*: *Hara*s Dembela, Kooba, Tarre, Dulecha. In 2007 repondents also mentioned the Rivers Dayu, Yotodi (though many irrigated farms along it), Ganna, Awajiro and Tagona (found on lower mountain).

[46] *Hora* mentioned in 2007 include *Hora Egana, Hora Awajiro* and Hora Aba Warra.

[47] *Haya* mentioned in 2007 include *Haya Qerensa, Haya Ado, Haya Sayida* and *Haya Gurati.*

Climate and climate change

The PA receives its first rain from September through November and the next rains from March until May. Though rainfall is still relatively high, the intensity is said to have decreased over the last 10-20 years. The rains that were currently falling (during the first phase of research) was said to be 60% of what is normally expected. In 2007 community members also complained that there were more recurrent droughts.

At the same time temperature is said to be increasing, particularly during *bona* (the dry season). June to August tend to be the hottest months.

Livestock and livestock health

It is the seasons of change when most livestock are lost to disease i.e. in *Adoolessa* and *Hagaya* as variable temperatures and rainfall make the livestock more vulnerable. Wind also becomes a problem.

Wildlife attacks are a particular problem in *Bona,* including hyenas and lions. Community members differed in their opinion as to whether incidences of predation had gone up or not. Those that argued that numbers had gone down said that this was a result of increased settlement and encroachment into the forest. In 2007 community members also said that wildlife attacks on livestock had increased over time and were a problem – they said that in the past people had weapons and were praised for killing animals such as lions. But now community members are not allowed to have weapons or to kill wild animals even if they are eating their livestock – so the incidence of livestock being killed by livestock is on the rise.

In general, resources found in Erba and neighbouring *kebele* favour livestock production, and if access is maintained livestock production will remain the mainstay of the local economy. Despite this, government interventions and support such as extension services prioritise crop agriculture over livestock, with few resources dedicated to livestock extension services or improving livestock production (DMER_FGDM/F_01).

When livestock is sick a community member said he buys drugs from private vendors and administers them himself. There is no veterinary clinic in the *kebele.* Both the drugs that he buys from vendors and from the market are often not effective (DMER_KIM_01). Community members have not been taught about improved livestock husbandry (DMER_KIM_01). Community members complained that though the government supports crop extension there is little if any livestock extension services and the quality of livestock drugs available is very small and of poor quality. In 2007 different diseases mentioned include *garba, aba sanga, shahicha, qirixi buss* and *dhukuba alatti*. Community members said that when such diseases occur they will bury the livestock that die or burn them; and then leave the area immediately.

There is little, if any, incorporation of improved breeds or artificial insemination. Community members believe that livestock are more fertile once they have drunk from *hora.*

Bona (the dry season) is the busiest period for livestock sales, when buyers from highland and other parts of the country come to Delo Mena to make purchases (DMER_FGDM_01; DMER_KIM_01). During this time the weight of the livestock is at its lowest, but due to demand prices are at their highest. During the wetter months buyers are unable to get to Delo Mena due

to poor quality and water-logged roads – so despite livestock being of better quality/health during this period, sales are fewer and prices are lower.

In 2007, the price of a bull was ETB3000. Markets used at that time were Harodumail (47 kms away) and Mana (7 kms away) held ever two days. However at that time respondents said that there not much of a culture of selling livestock products, only eggs.

5.3 BERAK PA[48]

Berak *kebele* is found at a distance from the forest towards the lowlands. Livestock owners practice *godantu* system taking their livestock up into the forested mountain areas in the dry season. Grazing is good in the PA and large numbers of livestock from other PAs visit during the wet season both from more highland areas (including Erba as described above) and the lowlands including herds of camel that are reported to have increased over the years. Some land is allocated to investors for large scale agriculture such as biofuels, and access to water and grazing is becoming more challenging. From around 2010 FARM Africa and SOS Sahel have been supporting the piloting of PRM in the PA.

Socio-economics and livelihoods

Table 5.7 Wealth ranking in 2007
Total number of households: 560

Rich 'duressa'	Medium 'wayyoo gobessa'	Poor 'deegaa'
40+ camel	10-30 camel	-
30+ cattle	20-25 cattle	3 cattle
50+ goats	25-45 goats	15 goat
1 mule	-	-
3-5 donkey	2-3 donkey	-
24	287	249
4%	51%	45%

In 2007 the wealth ranking showed that though there were a few households defined as 'rich' with as many as 40 camels, 30 cattle[49], 50 goats and other livestock, the majority of the community (96%) had much less than this with 51% being ranked as 'medium' wealth and 45% ranked as poor with only approximately 3 cattle and 15 goats. For a PA with rich grazing resources the number of poor, in particular, was surprising.

[48] The research team experienced significant problems getting to and moving around Berak due to heavy rainfall making roads impassable for the vehicle. The team had to walk and/or use pack animals and were limited to carrying out interviews and discussions with community members relatively close to the main settlement.

[49] It was noted in 2007 that though the wealth ranking states that the rich own 30+ cattle, herds of 100 cattle or more were disclosed by some of the individuals who were interviewed (Flintan et al 2007).

Table 5.8 Berak wealth ranking 2016

Rich *'olana'*	Medium *'gidu galessa'*	Poor *'harka qalleessa'*
40+ cattle	15-40 cattle	<10 cattle
60+ goats	20-60 goats	<10 goats
30+ camels	10-15 camels	<5 camels
30+ quintal maize	10+ quintal maize	<5 quintal maize
10+ quintal sesame	5-10 quintal sesame	<5 quintal sesame
30+ quintal sorghum	15-30 quintal sorghum	<5 quintal sorghum
10+ quintal wheat	5-10 quintal wheat	<2 quintal wheat
5%	30%	65%

Note: The %age of community in different wealth categories was based on purely what the focus group discussion suggested. However, it should be noted that the evaluation of households leading to qualification or not of the PSNP, was taking place at the same time, and the researchers felt that the FGD members had somewhat inflated the number of community members in the 'poor' category.

The wealth ranking carried out in 2016 showed similar results in terms of livestock numbers per each wealth category to those provided in 2007, excluding the poor category which appeared to have not only increased in %age, but also in terms of wealth having less livestock. However, as noted above, the PSNP evaluation was taking place at the same time that would determine which households would qualify for the PSNP, so the 'poorness' of the poor wealth category could have been exaggerated. In terms of crops, it would seem that cropping has increased in importance as a livelihood component – it was not mentioned at all in 2007: though this does not mean to say that there were no crops being grown at that time, it would appear that they were not important in determining wealth status unlike today. As one can see the amount of grains produced is fairly substantial; and overall the combination of livestock and crop production across the wealth categories was one of (if not the) richest out of all the communities/PAs that took place in this study.

The Berak community divided up a year into twelve months (*Sooma, Sooma fura, Sadatal, Haji, Zaka, Safara, Maulida 1ffa, Maulida 2ffa, Maulida 3ffa, Zara, Rajaba* and *Hexo*). These are spread over four seasons – *Ganna* (*Rajaba, Hexo* and *Sooma*), *Adoolessa* (*Sooma fura, Sadatal,* and *Haji*), *Hagaya* (*Zaka, Safara, Maulida 1ffa*) and *Bona* (*Maulida 2ffa, Maulida 3ffa, Zara*). Berak PA has similar wet and dry season characteristics as Erba and Sodu Welmal PAs.

Table 5.9: Seasonal calendar

Seasons / Characteristics	Gana(wet season)	Bona(dry season)	Adoolesa (Autuman)	Hagayya(Spring)
Rainfall	●●●● ●●			●●●●
Temperature	●●	●●●● ●●	●●●●● ●●●●●	●●●
Wind	●●	●●●● ●●	●●●●	●●
Grazing availability	●●●● ●●	●●●● ●	●●●●	●●●● ●
Water availability	●●●● ●●	●●●●	●●●●	●●●● ●●
Income from livestock sale	●●●● ●	●●●	●●●● ●●●●	●●●●

Income from livestock product	●●●● ●●●●			●●●●
Labour demand for livestock related activities	M	●●●●	●●●●	●●●●	●●●●
	F	●●●● ●●	●●●● ●●	●●●● ●●	●●●● ●●
Labour demand for non-livestock related activities	M	●●●● ●●●	●●●● ●●●	●●●● ●●●	●●●● ●●●
	F	●●●	●●●	●●●	●●●
Incidence of disease	●●		●●●● ●●	●●●● ●	●●

Community members (DMBK_FGM_01) said that labour demand between men and women is equal in all seasons – both work hard. Women spend the majority of their time looking after livestock taking about sixty percent of their time. Men spend the majority of their time on non-livestock activities including crop farming. It is the men however that take the livestock to dry season grazing areas.

Table 5.10 Trend Analysis

Characteristics	**Ten years ago**	**Currently**
Quantity of grazing land – open grassland	●●●● ●●●●	●●●●
Quantity of crop land	●●●●	●●●● ●●
Time taken to access grazing in dry season	12 hours	12 hours
Time taken to access grazing in wet season (on the understanding that they have moved to the wet season grazing area and have a base established there).	2 hours	4 hours
Time needed for accessing water for livestock		Doubled
Browse availability	●●●●● ●●●●●	●●●●● ●●
Right to access grazing land	●●●●● ●●●	●●●●●
Types of animal owned	Same	Same
Quantity of livestock owned	●●●●● ●●●●●	●●●●
Number of conflicts with wild animals that kill livestock	●●●●● ●●●●●	●●●●●
Income from livestock	●●●●● ●●●●●	●●●●●
Food from livestock	●●●●● ●●●●●	●●●●

The trend analysis suggests that the quantity of grazing land has reduced by half, and the quantity of cropland increased. Browse availability has also decreased. This has resulted in half the number of livestock owned compared to ten years ago, and a reduced income and food from livestock. Conflict with wild animals were said to have decreased – the reason for this is not clear but perhaps it is due to there being fewer wild animals because of the increased disturbance to their habitat because of crop farming etc.

Climate and climate change

The community stated that rainfall is less today than it was four years ago, and as a result is not filling the ponds during the wet season(s).

Livestock grazing resources

The *Gamoji* (lowland) grazing area is the key grazing for the community in Berak, which extends across an area of 150km sq. Livestock is kept here during the main rainy season – *ganna.* Grazing resources would allow livestock to stay there longer but surface water tends to run out after two months (there is no permanent water source here) and also livestock is moved to avoid contraction of a disease locally called *girixi bussi*, which is associated with tortoise bones (see below).

This is a vast grazing area, for which the community is developing management plans. The community are organised into grazing cooperatives (as mentioned above), similar to forest user cooperatives. The grazing area has been divided into three management zones, including some kept aside as a reserve. One cooperative has been established for each zone/block, except for Waqdabare where the zone has been divided into two blocks, thus with two cooperatives, because the area is large. The three major zones are:

i) Zone 1: Kobe (one block) – here a lot of land is being given by local government to investors for agriculture. The area is prone to conflict and currently there is fighting between community members and the investors.[50]

ii) Zone 2: Sadeta (one block) – there is one investor here.

iii) Zone 3: Waqdabare (two blocks) – there are no investors found here. The area is wide, so it has been divided up into two blocks.

Through the grazing cooperatives the community is increasingly trying to place some controls on grazing, in order to better manage, develop and protect it and ensure that there is enough grazing available for their own use, as well as for the visitors who are many (coming from more than ten neighbouring *kebele*). This has meant that they are starting to place restrictions on the grazing, particularly by outsiders, and this has caused some of the discontent voiced by community members from Erba *kebele* as described above. According to the cooperative's by-laws, 1 Birr is charged for one cattle, and 2 Birr is charged for one camel for the whole of the wet season. Outsiders are also charged for using the mineral lick – 1 Birr for 1 quintal of minerals.[51] Cooperative members complain that they are willing to share their grazing and other resources, but the visitors do not follow the cooperative rules (e.g. grazing rotations), and therefore increasingly they are trying to stop them coming.

Increasingly the community has seen the health of the wet season grazing area deteriorate. In particular they have seen the invasion of *jirime* (a thorny bush), which has taken over large areas

[50] Community members secretly go the investors' land and allow their livestock to graze there. They are dissatisfied with how the investors behave including that they do not allow local people to take their livestock there at all – even after harvest when the livestock could graze on the leftover stooks/straw (which otherwise is left to rot).

[51] Interestingly the woreda Livestock/Pastoral Office did not have this information. They said that the practice is new, and requires close monitoring.

of previously quality grasslands. Previously the community used to destroy it by burning the grasslands three times a year. However, the government has banned the use of fire in this way. Now the bush is taking over, is unpalatable, prevents movement and also harbours wild animals. The grass is being destroyed.

Livestock is taken to the dry season grazing area during Adolessa and stay there for around two months. This is called *Badda*, and the herders from Berak tend to go no further than the Welmel River using the forested area around Welmel and below the road that goes from Delo Mena to Harena. Though inhabitants from Erba and neighbouring kebele come to Berak in the wet season, the respondents spoken to said that the inhabitants of Berak do not take their livestock as far as Erba or to the Harenna Forest (though this disagrees with what the Erba community members said!!). The highland areas have a good grass type called *citta* and *hudugudessa*, mixed with browsed plants. There are some problems with wildlife here including lion and hyena, but this not significant. The main challenge is the increasing cultivation taking place on the way to these areas, and to a lesser extent in these areas, which blocks livestock movement and destroys the grazing.

Following *Adolessa* the livestock is taken back over time to the lowland areas. During *Hagaya* they stay in grazing areas called *Kurfe, Barfata and Libe* for around one month.

Table 5.11 provides a summary of dry season grazing areas used by the Berak community[52]

Table 5.11 Dry season grazing areas and other resources used by the Berak community	
Dry season grazing areas	**Characteristics**
Saala (Sole?)	In highland areas. These grazing areas have good pasture mixed with woodland. Water is sourced from the Welmel River close by. Good grass types include *citta* and *hudugudessa*, mixed with browsers. Cultivation is hampering normal movements.
Hadho	
Ciisa	
Galee	
Korbessa	
Ade Waataa	
Raphi	
Ardaa kuufa	
Okotiin	
Kurfe	Noted as *Adolessa* season grazing
Barfatu	
Libe	

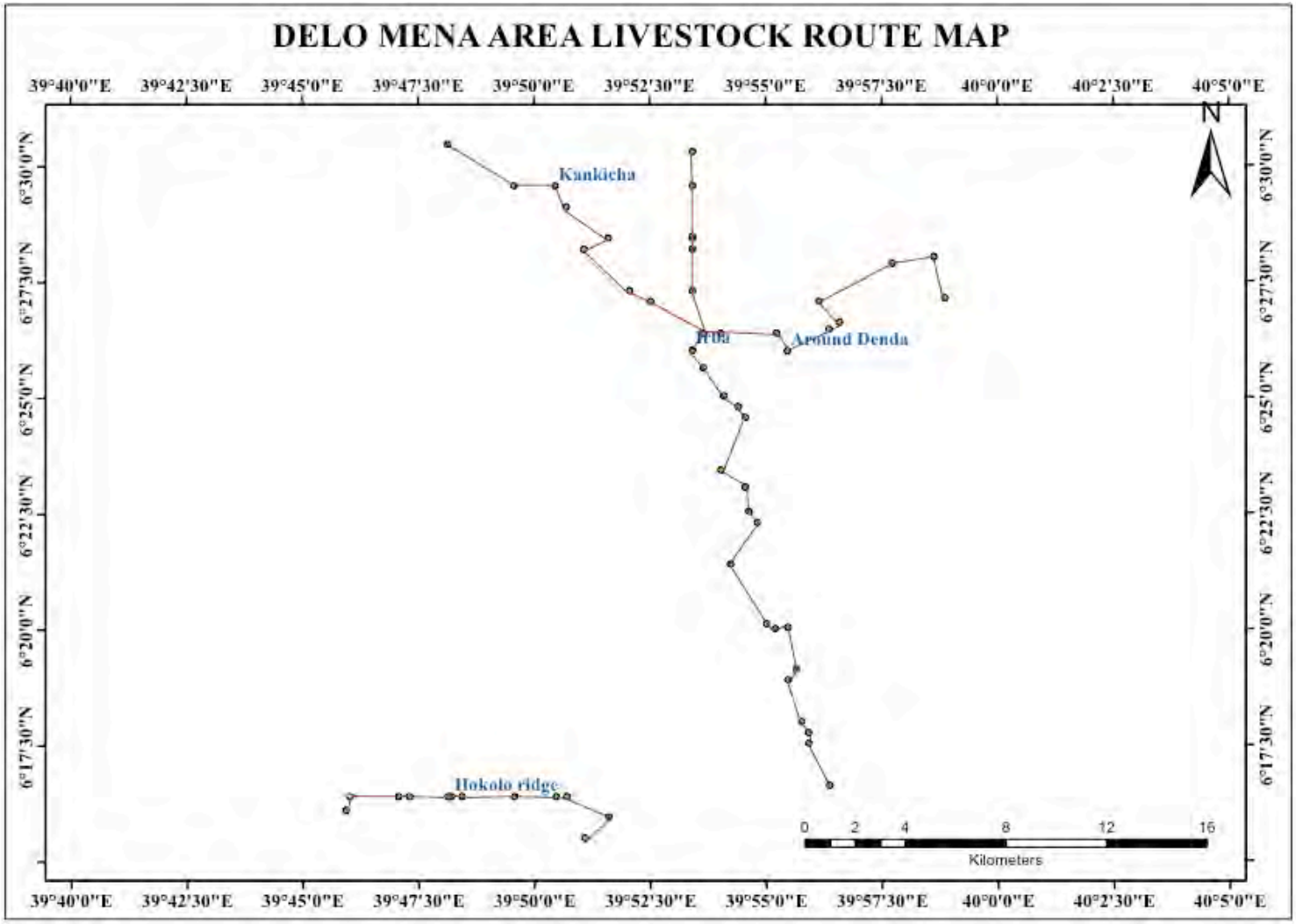
In 2007 it was noted that though Berak does have reasonable dry season grazing, livestock keepers prefer to go to Welmal River area because there is better water availability, and also it reduced the chance of anthrax said to be caused by the dead bones of tortoises of which there are many in Berak. In 2016 respondents said they still use the area around the Welmal River for grazing. It takes 4-6 hours to get to the Welmal River from Berak.

[52] In 2007 the following dry season grazingareas were mentioned: temporary settlement on the Welmal River around *Arar* and towards it source, though there can be a problem due to wild animal attack, starvation due to insufficient grazing, and accidents wehre cattle fall off steep slopes into valleys. Can move further to *Hora Koree* (Meda Welabu), *Jage* (mineral spring – also wet season grazing), *Libe, Barfatu* and the following though there can be shortages of water here: *Dima sola, Gorro Zallo, Haragissa.*

Table 5.12 provides a summary of wet season *ganna* grazing areas in Berak *kebele*[53]

Table 5.12 Wet season grazing areas and other resources used by the Berak community	
Wet season grazing areas	**Characteristics**
Sire	Grasses found here include *daramo* (in abundance), *kodhessa, farado, jejeba, hasare, kuyera*. Browse found here includes *bisdhuga, hagarsu, hamarressa, kokoro* (when it rains), *fursa, huruffo, jirime*. *Jirime* is a thorny bush that has invaded the grazing land, but is browsed/eaten by goats and camels. A plant has been introduced by investor farms – a weed that was not seen in the area previously, and has caused livestock deaths.
Dima sole	
Dima jirime	
Qerensa	
Feeja	
Baladee	
Hara Goobana	
Waqdabare	
Leedi	
Mada Callo	
Diriyee	
Hargisa	

[53] Wet season grazing areas mentioned in 2007 include; *Blade, Hallo Laku, Hora Gobana, Waf-Dabar, Hara Feransa, Garo Fallo, Sodeta* (popular) and *Bite Waqdabari* (though there was a problem in both of these due to hyena attack and prevalence of diseases – *kirite, awara, abba sanga, joge, Jage, Dima sole, Barfotee* (livestock wells), *Hamayaa.* In addition they mentioned that the following used to be available but now they are reserved for other communities as well as being within Park boundaries : *Hora Sora* (mineral spring) reserved for Mena and Barbare communities, *Qerensa* (meaning leopard), reserved for Mena and Barbare communiites, *Hora Sogida* (reserved for Barbare communities), *Hode* (reserved for Medda Walabu community), *Hora Manebo* (reserved for Medda Welabu community).


DELO MENA AREA LIVESTOCK ROUTE MAP
39°40'0"E
39°42'30"E
39°45'0"E
39°47'30"E
39°50'0"E
39°52'30"E
39°55'0"E
39°57'30"E
40°0'0"E
40°2'30"E
40°5'0"E
6°30'0"N
6°27'30"N
6°25'0"N
6°22'30"N
6°20'0"N
6°17'30"N
N
Kankicha
Around Denda
Hokolo ridge
0
2
4
8
12
16
Kilometers

Livestock water resources

Water is available in the *kebele* as surface water in ponds during the wet season. It is understood that the government helped to build the ponds some years back. However, the community said that since 2012 there has been rainfall scarcity and this has meant that the ponds have not held water for as long as they used to, so restricting grazing in the area. Many of the ponds are also sites of mineral licks or *haya* – see below. Two key ponds are *Hara Abdi Hussein* and *Hara Mame* (though this one is now used only for human consumption due to water shortages).

In the dry season the community takes the livestock to the highland areas, and here they access the Welmel River (and others) in order to water their livestock. Though the River provides a reliable permanent source of water, it now takes them double the time to get to the River than it did ten years ago because increased cultivation in the area has blocked livestock routes. Other Rivers close to Berak area the Dumal and the Deyu.[54]

Livestock mineral/salt springs and licks

When the livestock move to dry season grazing areas they visit the mineral/salt springs or *hora* there[55]. In Berak PA during the wet season the livestock visit the mineral licks, mainly found in the same places as the surface water ponds. Community members said their livestock get fat and healthy (with milk increasing) when the use the mineral licks. These include:

Haya found in Berak:

- Haya Dima Sole
- Haya Diam Jirime
- Haya Hara Gobena
- Haya Hara Koro
- Haya Balade
- Haya Darara
- Haya Barfata[56]

In addition, some *haya* have been destroyed or encroached by cultivation including *Haya Jage* (destroyed), *Haya Sadeta* (encroached), *Haya Libe* (encroached) and *Haya Sora* (encroached).

Fodder

In 2016 community members interviewed did not mention fodder collection, though observation suggests that fodder is collected particularly for those animals kept around the settlement during the dry season. In 2007 fodder species collected included *adda* (tree), *galee* (climber), and grass.

[54] Other water sources mentioned in 2007 incude *Horal Guratti, Qabaa Dima, Qabaa Kadir, Dimituu* (wet season ponds), *Jage* (water well), *Balade, Sadette* and Duman River 9though not convenient as surrounded by bushes with spikes. Accessing water in dry season was said to be difficult and included Welmal River (6 hours walk), *Haya Dima,* and *Bururii* (dry season pond). By the end of the dry seaon the cattle can be too weak to walk to the River so it must be collected and brought back for the livestock near the homestaead.

[55] In 2007 these were mentioned as Hora Sodeta and Jage Hora - both said to be in the PA.

[56] In 2007 respondents said that there were using eight mineral licks at that time.

Livestock production, health and marketing

Community members said that the livestock numbers have reduced in response to the reduced grazing and browse available. This contradicts the information provided at woreda level, which shows a 3-fold increase in livestock in Delo Mena as a whole.

In 2007, a women's FGD said that numbers of livestock per individual livestock keeper have decreased from 100 in Haile Selassie's time, to 50 in the Dergue, and were then in 2007 only 5 (though the above wealth ranking shows that most households held considerably more than this). Further in 2016 despite some questions on the validity of the results particularly the 'poor' category[57], the wealth ranking showed that livestock figures per household were similar (or the same) to the figures given in 2007 per household, even though the number of households has increased, and there were clearly greater pressures on land and resources (particularly as the amount of crops grown has increased substantially). This would suggest that livestock numbers have actually increased.

The markets used by the community were not mentioned. In 2007 these were said to be Delo Mena (most used) and Didre (in Meda Welabu District) when visiting the Welmal River.

Community members mentioned that they had heard that the local government is looking to introduce a new breed of cattle into the area, which the government has said will improve productivity. However, the community is very suspicious about this and the motivations of the government in this regard.

The most serious health problems for livestock are i) *guro* (mastitis) and ii) a disease locally called *girixi bussi* said to be caused by livestock eating dead tortoise bones[58]. The tortoise hang around the ponds and mineral licks in the Berak grazing areas during the wet season – lions kill the tortoise and leave the bones lying around. Community members said that livestock seek out the bones, and if they are allowed to eat them they can die within one or two days. In order to avoid this the community limits the time grazing in the area. The community said that this is one of the most serious problems that they face, and action is required to deal with the issue. They even suggested vaccinating the tortoise to keep them healthy.

A number of other diseases were mentioned by the community including *aba sanga, aba gorba, gaama mansa* and *furtu* (which is said to attack fat animals). In addition, a new plant has been introduced from the farms of the investors. This was not found in the area before the investors came. The plant makes cattle sick when they eat it, and can kill them. Around twenty cattle have been killed in this way. Note: this was also mentioned in other PAs above where large farms were present.

[57] As above – the researchers suggested that the 'poorness' and %age of the 'poor' category may have been exaggerated by community members because the evaluation for the PSNP was taking place at the same time and some community members saw the two related i.e. if there were seen to be more poor in the community then more community members would qualify for participating in the PSNP.

[58] This disease was also mentioned in 2007. Other diseases mentioned then include *biraa, jongii, turnea,* and *aware.*

Community members complained that the government is not providing them with livestock extension services. This means that they are given no guidance about how to improve livestock production. There are not drugs available to treat their livestock. They buy useless drugs from private traders (licensed or not-licensed) – there is no alternative.

The community said that the government only seems interested in increasing crop cultivation in the area, but the area is not suitable for this because there is a shortage of rain. In addition, even with adequate rainfall the land itself does not support more than one cropping.

Conflicts with investors

In 2007 community members were already complaining that their land was being given to investors – at that time mainly for growing of biofuel (*jatropha*) and local people had protested the move resulting in their arrest and imprisonment. In Berak today, community members say the continuing loss of their land to investors is the biggest problem that they face. The community is angry that their grazing land, including their best grazing land, is being given to investors by the government (mainly woreda government with approval of zone/region). The investors today are mainly local, but with business partners from outside the area.

Community members complained that the investors cultivate two to three times more than that which they are allocated/leased, and often use it for other purposes that what their contract/lease agreement states. Chemicals and fertilisers used by the investors harm the land; and a plant introduced by the investors kills their livestock. Some community members even went as far as to suggest that the investors had purposefully introduced the plant to kill their livestock.[59] Now, they say, all the best land in Berak PA has been demarcated for investors, and they (the local community) are not allowed to use it, even it is not under production. Yet when the community asks for land in order to cultivate crops, the government denies them saying that they do not have the right implements or tools to farm the land. When investors abandon land, it is of poorer land quality and more degraded than it was before.

Livestock keepers have expressed their dissatisfaction at the situation by allowing their livestock to enter the investors' farms. This may result in the livestock being imprisoned by the investors. This is an ongoing conflict between the two groups. Even the local *kebele* administrators are not in agreement with the plan of the higher levels of government to allocate land to investors. Currently there seems not solution to the problems. Community members said this situation is "*humanaan gudeedu"* meaning "raping them."

5.4 Synthesis and future scenarios

Community members said that today they are facing crises that they have never faced before. There are four critical factors influencing increased concerns of community members over their future access to grazing areas, and as a result, their livestock-based livelihoods and future food and human security. These are i) the enclosure of grazing areas in Berak *kebele* – the area used by Erba residents for wet season grazing; ii) the allocation of grazing areas by local government to investors; and iii) the demarcation of the boundaries of the BMNP; and iv) increasing

[59] When the researcher brought up this issue with the government extension agent he said that though indeed the plant is dangerous, it has not been purposefully introduced.

restrictions put in place by the Oromiya Forest Enterprise. This is despite the fact that livestock numbers in the Delo Mena woreda as a whole has substantially increased (see above).

Of critical importance and the issue that communities are very angry about in Erba *kebele* is the demarcation of the boundaries of BMNP currently taking place. They said that before the last few years they had a good relationship with the Park and now this is completely breaking-down as they feel marginalised at best, and at worse that the Park and those working for the Park are trying to destroy their livelihoods. They know that poor land and resource use can negatively impact on the wildlife, vegetation and biodiversity – and there are some who do not abide by communities' rules related to grazing patterns for example (i.e. some do not move out of the forest in the wet season). However, many of the pressures on land and resources do not directly come from them, but rather from government for example the resettlement programme and the ongoing distribution of grazing land to investors and/or have been influenced by climate change.

There is population increase in local communities and this is contributing to a greater exploitation of resources including encroachment of the forests. However, community members said that they can offer solutions for this including the protection of critical grazing areas first and foremost (e.g. in Berak), providing alternative livelihoods for those who try to settle in the forest, and punish those who do not abide by local bylaws. Community members stressed that they have never damaged the forest – a forest that their ancestors have been using for many years – yet now their access to the forest is being taken away from them.

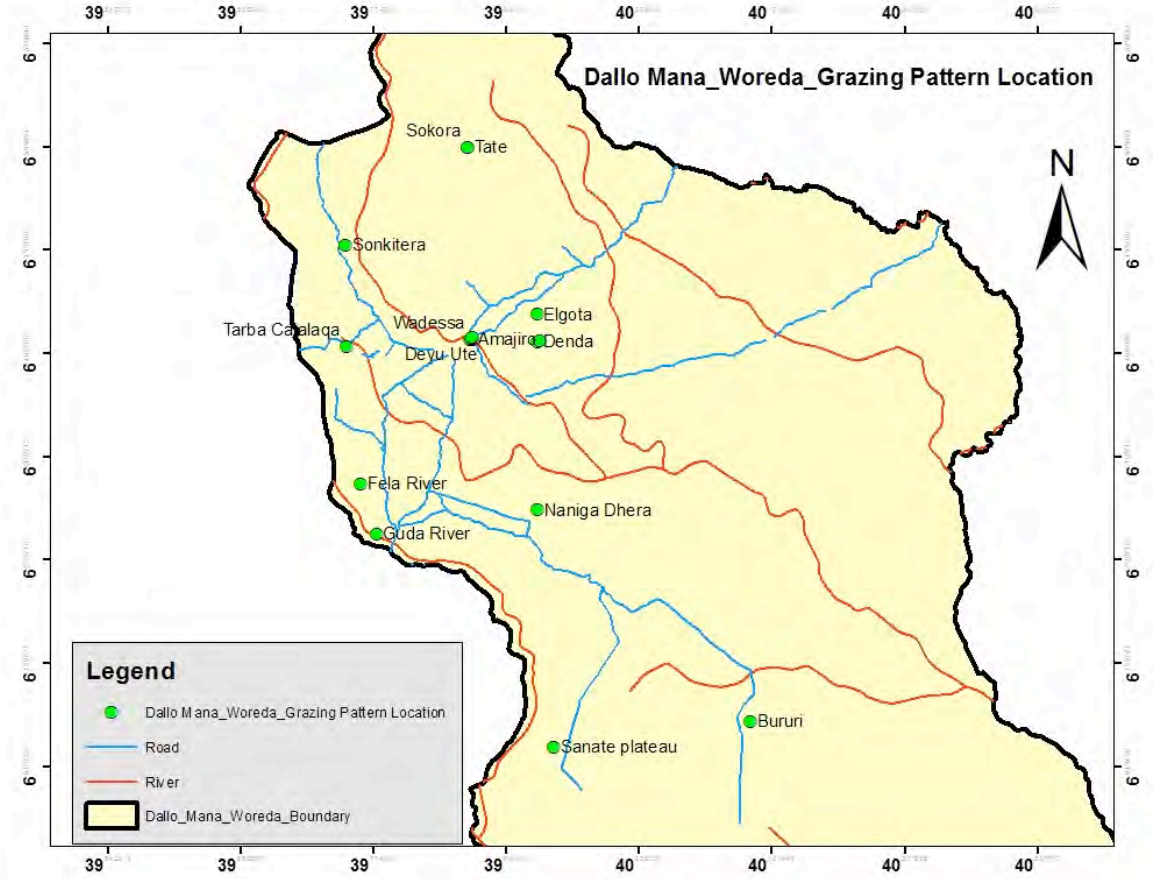
In order to resolve the escalating negative situation, the community suggested the following solutions. They said that Park staff should meet with them and discuss how the issues can be resolved – the Park should not make these decisions alone. Livestock should be allowed to graze in the places they have been grazing to this time, with agreed rules and regulations and punishments for those who break these. If the Park insists that livestock is not allowed at all within the boundaries, then the boundary should be moved to the other side of Daroo (dry season grazing area). Forest adjacent communities should be given sole right to protect and guide the utilisation of forest resources to avoid loss of the biodiversity, including controlling those people who stay longer in the forest than has been agreed. In addition, the government should better control investors – giving the land used by the poor to rich investors can only damage local communities, and investors should only be allowed to use the amount of land that has been leased to them. Remaining grazing areas need to be protected for grazing and not allocated to agriculture. Livestock rearing does not mean destroying the forests and land, but crop farming does – so livestock is a better use of the land than crop farming in that it also protects the forest and wildlife. The community said "our livestock production should be supported not destroyed."

In Berak, the most critical issue is the increasing allocation of their grazing lands to outside investors by the government. This reflects a bias by government for crop agriculture and against livestock – a bias that is not only reflected in this land allocation but also through the lack of extension services provided for livestock and lack of response or support for dealing with livestock diseases. The communities described the giving of land to investors as killing the land and "raping" themselves as the land is not suitable for cultivation, their best grazing areas are being taken away, and their livelihoods are being destroyed. At the same time grazing lands are being infested by invasive species, that they are no longer allowed to or able to control. Livestock productivity is decreasing due to poorer quality of grazing areas and disease.

Population is increasing and people are getting poorer – the trends in land use and resulting changes in livelihoods can only lead to a continued deterioration of the community.

Previously the two PAs peacefully shared resources, but divides are being established as Berak PA restricts access of Erba PA residents to wet season grazing, and Erba PA restricts access to Berak PA residents to dry season grazing. Though Erba PA have not yet started restricting this access they are threatening to do so if Berak further limits their use and access. Though some of the contributing land use changes taking place that are fueling the situation are led by community members themselves they have been aggravated by the interventions in the area including the BMNP, the Oromiya Forest Enterprise and others such as the PRM activities supported by FARM Africa/SOS Sahel. These interventions have worked within PA, ecological and/or intervention-focused boundaries that have failed to understand and/or take into account how local communities work across the boundaries, and the cooperative arrangements that exist to do so. This confirm the need for such actors to take and support a wider landscape/watershed approach that would be better placed to understand and incorporate such arrangements, and limits the unanticipated negative impacts of working in a smaller area.

Figure 5.6 Map of grazing areas in the Delo Mena woreda as described by respondents



6.0 NENSEBO WOREDA

6.1 Introduction

Nensebo *woreda* is predominantly sub-tropical (52%) and temperate (45%) with small tropical zones (3%). In 2007 natural vegetation coverage continued to predominate (58%) followed by arable land (22%) and pasture (18.5%). The climate mainly follows two seasons – a dry season from December to May (though there may be rain in January), and a wet season from June to November with July through to September receiving the heaviest rainfall.

Livestock populations of the *woreda* date in 2000 stood at 100,617 cattle; 17,252 shoats; and 6,210 equines, which equals 76,194 TLU or 124,079 heads of livestock. No 2007 data was obtained. The total number in 2015 however was 251,845 heads, made up of 156,353 cattle, 70,777 shoats, and 24,715 equines. This shows a doubling of livestock numbers over the 15 years, with a lesser increase in cattle numbers (only 50%), but a 4-fold increase in the number of shoats and equines. This is not surprising given the more sedentarised living in the woreda with a large amount of cattle kept in more intensified zero grazing systems, whereas shoats in particular are able to browse on remaining resources more easily.

Nensebo is regarded as 'highly suitable for crop production' and in particular coffee by the regional government (OSG 2000). In 1975 Ayele (1975: 56) reported that:

> *"In Nensebo Woreda, Livestock Zone, livestock owners graze their animals in the broad leafed areas from November – January, and on the open plains from March to November. The stockowners take their animals to the forest areas because of lack of grazing. They move to the plains when the grasses, herbs and plants in the forest areas are harmful to their animals, and also because of the abundance of biting flies in the rainy season in the forests."*

Table 6.1 Comparison of livestock type in 2000 and 2016

Type of livestock	**No. in 2000**	**No. in 2016**
Cattle	100,617	156,281
Sheep	17,252	57,411
Goats		13,366
Horses	6,210	21,147
Mule		983
Donkey		2,585
Total	**76,194 TLU**	
Poultry		31,990
Traditional bee hive		50,427
Transitional beehive		1,931
Modern beehive		367

Table 6.2 Cattle population by stage of growth, production status and sex in Nensebo woreda 2016

Cattle	No.
Cow	48,365
Heifer	31,657
Bull	26,831
Steer	17,506
Ox	5,019
Calf	26,903
Total	**156,281**

In 2000 Nensebo Woreda still had extensive forest cover. Satellite data compiled by the BERSMP suggests a 9% reduction in forest cover between 2000 and 2006. Though the area of grazing land stayed pretty much the same during this period, the amount of agricultural land increased by the same amount – 9%. This confirms what community members describe – that forest has been mainly cleared for agriculture (See Figure 5.1 and 5.2).

Figure 6.1: Satelite imagery showing a reduction in forest cover by 9% and conversion to agriculture between 2000 and 2006 (Source Flintan et al 2007).

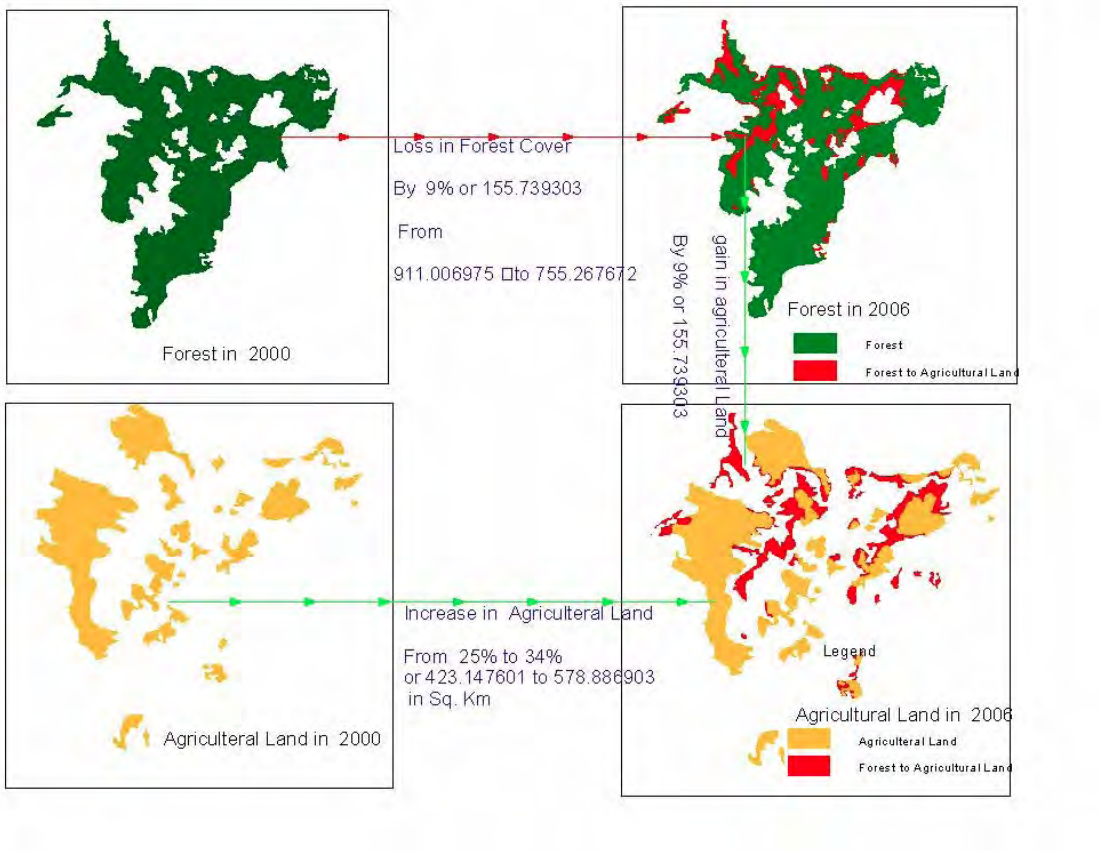
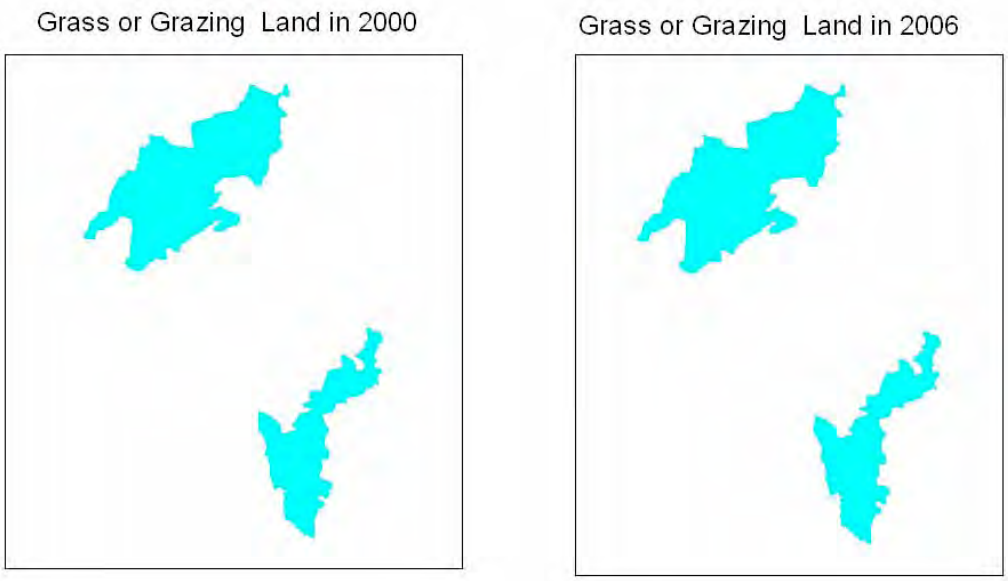


Figure 6.2: The amount of grass and grazing area remained the same



6.1 SOLANA PA

There is very little grazing area in Solana PA. Not only is much area forested, albeit reduced, what grazing area there was has gradually been converted to agriculture. This trend commenced in the 1960s when Haile Selassie, convinced that there was potential for agriculture in the area, gathered landless people from the northern and central parts of Ethiopia, particularly from Amhara and Shoa, provided them with firearms and a site in the forest and told them to build themselves a settlement and clear and 'develop' the forest. Despite conflicts with the landlords of the area (local chiefs and 'shifta' as they were called) the settlers cleared the forest and have been living there ever since: the people around Worka (the main town in Nensebo) are almost all settlers. This period was called "Ye limaat zemen" or "Bara limaati" meaning "development camping". Originally having no livestock a few were introduced but faced challenges of disease and "dangerous forest insects". In 2007 community members stated that there were already "no resources left for livestock in the PA" (Flintan et al 2008).

Livelihoods and socio-economics

Table 6.3 Solana wealth ranking 2007
Total number of households: 154

Rich ***Olanna***	**Medium** ***Jidugolessa***	**Low** ***Gadanna***	**Very low** ***Bayee Gadaana***
40 quintals coffee per year	25 quintals coffee per year	10 quintals coffee per year	5 quintals coffee per year
1 ha. enset	0.5 ha enset	0.25 ha enset	0.125 ha enset
30 quintals other crops	20 quintals other crops	10 quintals other crops	5 quintals other crops
16	43	63	32
10%	28%	41%	21%

Note: In 2007 livestock were not mentioned at all during the wealth ranking.

In 2007 livestock was not considered a strong component of livelihoods, and rather people relied on coffee, enset and to a lesser extent other crops. On average people had landholdings of 2ha. Any remaining land at that time was being distributed to the landless by the government. People relied on private enclosures for their livestock, and/or livestock were tied up – with the objective of fattening livestock for the market. At that time feed shortages were experienced during the dry season and then fodder and feed supplements were often purchased to give to the livestock.

Today only a few members of the community keep livestock, not considered to be a large component of their livelihood system. Livestock is mainly kept under zero-grazing, with grasses cut-and-carried for them by the livestock keepers. During the wetter months (June-November) most community members are involved in coffee production in the forest areas. Community members said that grazing areas had also been converted to coffee plantations. Taxes are paid to local government for use of land. Community members said that they are careful to only farm and keep their livestock within their allocated individual household boundaries to avoid conflicts with neighbours: though sometimes conflicts do occur between landholders.

Both men and women contribute to the livelihood system. Women's responsibilities including milking cows; looking after calves; cutting grass and feeding animals; providing animals with water and for domestic use; cleaning the house, washing clothes etc.; selling milk and making/selling butter in market; gathering firewood; selling/trading of goods; and supporting their husbands in coffee production, crop and vegetable growing. When the husband is not around the wife will be responsible for the family and livestock. Often children will also help with these activities.

Men's responsibilities include farming (weeding, planting, harvesting, selling); fencing of grazing areas (enclosures for different types of animals) and those areas that are used for cut-and-carry and/or hay production; veterinary care of animals including taking for vaccinations; selling of animals; purchasing of grazing/grass, mineral soils and other livestock inputs as required; collecting feeds from farmlands and pastures for livestock; feeding of mineral soils to livestock when needed; general livestock management; and overall family care and security.

An average household head from the 'rich' wealth category educated to grade 3 from a household of ten, has 7 cattle, 5 sheep and 2 donkeys, together with 4 hectares of farming land. On the land he grows coffee, enset, barley, teff, maize and vegetables such as cabbage and onion. His annual harvest for barley is 8-10 quintals per hectare, and for maize it is 10 quintals per hectare – most grains are gown for household consumption. One hectare of land for coffee produces 25 quintals – nearly all sold at the local market. He uses purchased chemical fertilizer and organic including cow dung and compost to increase productivity of land. Over the last few years he expanded his coffee growing area as it is a more lucrative crop. He plans to grow more grains in future for household consumption (NESO_KIM_01).

An average household from the 'poor' wealth category educated to grade 6 has 2 cattle and 1 donkey, with 1 ha of farming land on which he grows coffee, enset and vegetable such as cabbage and onion. He has adequate feed for his livestock particularly in the wet season when he cuts good quality grass from his enclosure. In the dry season he has to rely on use of enset and weeds that grow under the coffee bushes. He produces 25 quintal of coffee on his one hectare of land, though this can be lowered to 12.5 quintals when the rainfall is inadequate or erratic. He sells the coffee and enset produced and uses the money to purchase food items for household consumption. He does not use chemical fertilizer for his crops but sometimes adds compost. In future he wants to grow more crops to more income and meet family needs, but the shortage of farmland hinders this. When his cow is lactating, approximately every two weeks his wife makes butter to sell in the market (NESO_KIM_02).

A male youth aged 26, educated to grade 9 has 3 cattle and 2 sheep, and comes from a household of 4 members. He has 2.125 ha of land on which he grows enset, teff, coffee, eucalyptus trees and vegetables including cabbage, chilli and onion. He produces 20 quintal of coffee, and 50 quintal for enset from his land with majority sold. He uses compost to increase productivity. He grows and cuts grass for his livestock in the wet season on land that he rents from another landholder for 400-500/ha per year. Sometimes the grass is not enough and he has to feed the livestock enset or let them graze in the marshy areas, though they can pick up liverfluke worms here. In the dry season he uses enset leaves, weeds, and teff straw. In the future he wants to grow more coffee as this lucrative (NESO_KIM_03).

Community members said that the population in the PA has significantly increased in the last ten years. They also commented that in the past there had been a problem of thievery in the kebele but this is rare now due to increase religious practice, the commencement of community policing and other things. In the last few years a new road has been built connecting the kebele with the woreda capita, Warka. There has also been the introduction of mechanized coffee cleaning technology, which has contributed to better quality coffee and higher prices. With increased incomes there has also been an increase in money-saving.

Grazing

As above, nearly all livestock (particularly cattle) is kept under a privatized zero-grazing, cut-and-carry grass-fed system: there are only small patches of communal grazing around e.g. along roadsides, or in forest areas where there is no coffee being grown. It was said that today it can take 30 minutes to find grazing if required, but most livestock keepers don't use it. There are said to be some areas not used for anything in the kebele, because they are steep and full of

stones and bushes, or wet/marshy and there is high incidence of liverfluke worms and the poisonous plant called *gonde* (see previously) here.

Though community members in 2016 said that there were areas for grazing ten years ago, the information collected in 2007 suggested otherwise and community members at that time said that in fact the situation was the same as it is today i.e. very little if any grazing. Similarly though in 2016 the community said crop growing was half what it is today, in 2007 community members said it was more (NESO_FGD_01).

There was said to be no browse available in the kebele.

Feed and fodder

In 2007 community members were feeding purchased feed supplements and crop residues (mainly teff), banana leaves and enset to their livestock to get them through periods of feed shortage (mainly in the dry season). In addition residues from local alcohol brewing were also fed to lactating cows and oxen.

In 2016, generally animals are fed on cut grasses, taking up about 60% of their feed. Another 15% of their feed consumption is taken by leaves/stems of enset, and 25% made up of sugarcane tops, barley and teff husks, maize stooks and straw (considered to be of poor nutritional value), and different palatable weeds (including those that grow under the coffee). There is little planting of improved forage grasses, apart from some elephant grass. In general there is sufficient feed for the livestock, though there may be shortage in a prolonged dry period. It takes on average 30 minutes to cut-and-carry grass (NESO_FGD_01). In 2007, respondents mentioned the high cost of purchasing fodder, however today it would seem that most people grow their own and/or use agricultural by-products.

There is little feeding of purchased concentrates to animals, though barley can be fed to donkeys that are very important for the transportation of coffee from the farm to the home, and then to market. When there are feed shortages priority is given to calves, lactating and pregnant animals, and those being kept for fattening.

Water for livestock

In 2007 respondents said that access to all communal water points had been stopped, and so they mainly relied on surface water, which sometimes became a problem between December to February (driest months).

Today respondents said that there is sufficient water for livestock in the kebele. When the dry season is very prolonged, some of the water points may dry up, but there are usually other sources available. It takes no more than 10 minutes for most people to collect water. No payment is required for using the water point (NESO_FGD_01; NESO_KIM_01; NESO_KIM_02; NESO_KIM_03).

Minerals

Community members said that in the past there were mineral sources in the kebele, but they have over time been destroyed or ploughed up. Today, there are no mineral springs or licks close by so community members buy minerals *(bojii*[60]*)* in the market brought by merchants from Shallaa and Arsi Negelle woreda. This is mixed with local soil (the red layer under the topsoil) and fed to the livestock. This practice was also being carried out in 2007.

Livestock production, health and marketing

Today, the average livestock holding is said to be 3 animals, compared with the 15 animals that community members aid was the average holding ten years ago, though the wealth ranking suggests more than this. A key informant from the higher wealth ranking (NESO_KIM_01) has 7 cattle, 5 sheep and 2 donkeys.

There are approximately 6776 livestock in the kebele with more than 60% being cattle (4155 in number), while the remaining are shoats (29.3%) (1,985) and equines (9.4%) (636). Note the large number of oxen – more than 10% of all types of cattle, being required for draught power; **and high number of bulls – mainly being fattened for sale.**

Table 6.4 Type and number of livestock in the PA in 2015

Cattle	**No.**	**Other livestock**	**No.**
Oxen	443	Horse	318
Cows	1543	Mule	13
Steers	150	Donkey	305
Heifers	795	Sheep	325
Bulls	610	Goats	1660
Calves	614		
Total	**4,155**	**Total**	**1,985**

Community members said they benefited from the sale of fattened animals, particularly in the dry season when livestock tend to be more health, there is feed available including enset and hay, and animals tend to put on weight. Though enset is not favoured as a forage (can give cattle diarrhea due to high water content), it is readily available.

They also get income from livestock products such as milk and butter (when there are conducive weather conditions and good feed supply) and there is time available to process them. In the past the selling of milk was viewed as a taboo, not least to prevent the selling of the milk then required for household consumption. However today there are increasingly other products to replace the milk consumed (though perhaps not as healthy). When livestock products are not consumed at home, they are sold in the nearby market (Warka, the district capital) about 10 km walk.

[60] In 2007, respondents said that this was soda minerals from the Rift Valley lakes.

Community members said they usually sell livestock when there is a specific need such as shortage of food for the household; for purchase of clothing, school items or payment of school fees; to cover medicinal/health expenses; or other family events/matters (NESO_KIM_01).

Ten years ago community members said that on average a household earned about ETB5,000 per year from livestock and livestock products, but today it is not less than ETB12,000. They felt that production of and income from livestock products has increased from ten years ago because of better road accessibility, expansion of market areas, the use of information systems and communication technology e.g. mobile phones. It was said that 10 years ago because of the poor access to markets etc. a bull was sold for ETB3,000 but today a well-fattened bull can sell for ETB12,000 in the nearby market. Respondents said that the fattening of bulls is something they have learnt in recent years (NESO_KIM_03). Because high prices can now be received for livestock and livestock products, it was said that community members often prefer to sell them then to consume them at home, leading to a significant reduction of livestock and livestock products used for household consumption over the last ten years. Ten years it was said that a liter of milk sold for 5 birr, and today it sells for 20 birr.

Livestock diseases were said to have reduced due to increased availability of vaccinations and drugs. A common time for disease is at the start and end of the rainy season, as the weather changes. Diseases associated with plant poisoning usually happen in the wet season. There are also liverfluke/*faciola* and leeches *dhulandhula* or *ulanula* found in the marshy areas but care is taken to avoid allowing the livestock into these areas (marshy). Though diseases such as black leg, pasturollosis, FMD, and gastro intestinal diseases are known in the kebele, there has been an almost zero occurrence over the last ten years (NESO_FGD_01). It was interesting to note that a key informant from the lower 'poor' wealth ranking contradicted this view, saying that such diseases were still common (NESO_KIM_02). When illness occurs community members tend take animals to clinic or call the veterinary personnel to the house (NESO_FGD_01; NESO_KIM_01; NESO_KIM_02). Though one respondent says that he also treats animals himself (NESO_KIM_03).

The community experiences no conflicts with animals as generally animals are kept at home in enclosures.

5.2 GERAMBAMO PA

Gerambamo PA is set adjacent to forest. During Haile Selassie's time the quality and quantity of grass was very high but productive land was under the ownership of the nobilities and feudal landlords where access was granted upon the payment of access feeds. When the Dergue regime took over land was nationalised and designated as common property for the people, and so access to grazing land was open and "100% free" (Flintan et al 2008).

In 2006 more than half of the PA remained under forest while the remaining while the remaining land was mainly grassland managed by individual households, mainly as enclosures. Under the EPRDF land had been measured and assigned to an individual (or husband and wife) land holder with a legal certificate. In 2006 a redistribution of land was carried out, and any marginal remaining communal lands and/or livestock routes were distributed to landless/jobless youth as plots of approximately 1 ha. There was also a small amount of subsistence agriculture.

Today there is no communal grazing land left in the PA, with almost all livestock owners having their own paddocks – private grazing area enclosed with a bamboo fence (grown on their own land). Locally called *kalo*, the enclosure is used for cattle and sheep. There are different *kalo* for different age groups, sex and type of livestock. Horses graze around the homestead, usually shackled to prevent them wandering too far. In the past livestock was able to freely roam in the forest, meadows and grazing lands, though there was the danger of wild animals and livestock-thieves.

Farmers in the PA grow *enset* (false banana), barley, cabbage, onion, garlic and potato. Livestock dung and other organic waste is used to make compost for fertilizing crops, particularly enset and barley. Enset and barley provides the major staple in the diet as bread and porridge (respectively). In 2007 though the growing of enset was commonplace, the growing of other crops was less common.

As across all of Nensebo woreda, the year is divided into two main seasons – *gana* (June – October, with particularly heavy rainfall between July and August) and *bona* dry season (November – May) though in wetter years the dry season can finish at end of January. Severe frost can occur in October and January, which can affect the enset.

Socio-economics and livelihoods

Table 6.5 Gerambamo Wealth Ranking 2007
Total no. of households: 91

Rich	Medium	Poor
50+ cattle	25 cattle	2-5 cattle
50+ sheep	15 sheep	4-5 sheep
20+ horses	3 horses	0-1 horse
I ha enset	0.5 ha enset	0.125 ha enset
12	46	33
13%	51%	36%

Women tend to have responsibility for taking care of cows and calves, and milking, including taking them to the enclosures, and cleaning out shelters. Women can make butter from the milk, which they can sell. They will also milk the goats and sheep, the milk of which will be used for consumption in the household. Men tend to prepare feed for the livestock; and set up the enclosures including building the fences (see below). The men also take the livestock to the dry season forest grazing area and watering points. The men alone sell and purchase cattle, horses, donkeys and mules; whereas the women will sometimes take care of the buying and selling of small ruminants. Women take care of all domestic tasks and taking care of the children. They also take grain to the mill to make into flour. Women take care of the growing and weeding of enset, and men cut it down. Women prepare it. Men construct households and tend to take care of most of the crop farming activities. Community members also produce honey in a variety of hives including traditional, transitional and modern hives.

In the trend analysis the community said about half the land is under crop production, however from observation it was clear that in fact it was less than this. Ten years ago the community was

reliant on enset as a staple food, but today the diet is more varied including barley and other grains. One respondent who grows enset, barley and vegetables said he produces between 8-10 quintals per hectare. He consumes most of what he produces, and sells only around 4-600 Birr's worth of produce. He uses both dung and artifical fertilizer on his crops. Though he grows more than he did before, he needs to grow more to feed his family.

Human population is said to have grown significantly in recent years. Polygamy is still common in the PA. One key informant (identified as 'rich') has two wives who live in separate households, but share the grazing and cropping areas (NEGE_KIM_01).

Climate and climate change

As described above the climate in the area is fairly wet and droughts are uncommon. The most recent drought occurred in 2008 when many livestock owners lost their animals, as many as 80-100 at a time.

Grazing for livestock

Twenty-five years ago grazing land in the PA was communal and open. In 2006, as described above a process was underway to allocate any remaining communal land and even livestock routes to landless/jobless youth. Today, there is little communal open grazing left in Gerambamo PA. Instead private enclosures are constructed, with different enclosures for different types and ages of livestock. One respondent (NEGE_KIM_01) said he was the one who had introduced enclosures to the community some years back. He grows grass in his enclosure to feed his livestock.

During the wet season the enclosures are moved every 2-3 days, while in the dry season they can stay there for around 7 days. During the rainy season the ground becomes wet and very muddy quickly. The enclosures are found around homestead and take about 10 minutes to access. Noone can enter another herder's *kalo* without their permission. There are no trees in the enclosures as their presence can make the ground muddy and soggy underneath, and fallen leaves can rot and make a bad smell that stops the livestock eating the grass.

Grasses such as *darimo* (perennial and palatable grass) and *sidisa* (leguminous and herbaceous plant, scientifically called *trifolium species*) are used as animal feed during the wet season of the year. *Sidisa* is used with caution, because if it is eaten by animals when it is at budding stage (especially by cattle) it will lead to bloating of the stomach of the animal, and may even kill it instantly. To avoid this problem the animals should graze the grass before its budding stage or after flowering. In fact, the herders already know how to take necessary caution in using this grass for animal feed. In the dry season the enclosures tend to dry up and can become dusty.

There is some still commonly held wet season pasture but it is swampy and there is a poisonous grass called *gonde* that can also occur in the area. There are also leeches and flukeworms that affect the livestock when they drink water there.

In 2007 community members did not mention use of the forest areas for grazing in the however in 2016, community mentioned that during the dry season livestock is commonly sent into the woodland areas. Here livestock are sheltered from the heat and graze in the shelter of the trees.

Livestock will also browse the trees including *saato* (*Erica arboria*), *heexo/heto* (Hygenia species) and *garamba* (*Hypericum species*). Care needs to be taken in the forested area as there can be leopard found there, and the ground can be steep and slippery. There are no major livestock routes in the PA as there is little movement. In 2007 community members said it was a common practice for those with relatively large tracts of enclosed land but few livestock to rent out their land to those with more livestock on a seasonal basis – it was said that this had been common practice in Gerambamo for some time.

Browse is becoming less available, mainly because forest cover is decreasing.

Water for livestock

Though sometimes water sources may be low e.g. in a long dry season, there is no serious water problem in the PA. It usually takes about 10 minutes to access water. Water is freely accessed i.e. without payment. In addition there is usually high humidity in the area and high moisture content in the grass, so livestock's water needs are not so high as in other places.

Mineral springs and licks

In the past the community was using *hora* in Baatu, Dhaldu, Bursa and Arbuchi. However increasingly community members have stopped using them as they were far away and some had been ploughed up for crop cultivation. Instead they purchase minerals (called *bojii*) from a place in Arsi Negele woreda, and mix it with red soil and feed it to their livestock. The *bojii* contains calcium, phosphorous and sodium chloride.

Fodder and feed

Feed shortages are not normally encountered, though if the dry season is long there can be a feed shortage. At this time they will be forced to feed their animals with feeds like false banana leaves (locally known *wese/wesse/* or *warke/warqee -enset*), crop residue (barley straw), and different plants leaves. The enset leaves and corms need to be chopped up, which can be a laborious task. One respondent commented that though livestock will eat the enset, it causes the animal to get diarrhea. Barley straw has poor nutritional quality. The researchers did not encounter anyone who fed purchased feed concentrates to their livestock. In 2007, one community member mentioned feeding the residue left from the making of local beer to their livestock; as well as enset, banana leaves, crop residues, and hay. At this time the fattening of livestock was already common place.

They will also move their animals to forest areas allocated as their private grazing area. The community do not tend to store feed and forage, and do not make hay.

Grazing in private enclosures can be rented. Ten years ago respondents said it cost around 400 Birr per year, while today it costs around 10,000 Birr per year.

Livestock Production, Marketing and Health

According to the trend analysis, ten years ago the average livestock holding was 50 (including all types), whereas today an individual herder has around 20. However, the numbers of livestock

provided by the woreda government show that numbers have significantly increased from 2000 to 2016 (see Appendix 1).

Table 6.6 The total number of livestock in Gerambamo kebele (in 2016):

Type of livestock	Number
Cattle	21,050
Sheep	11,432
Goats	936
Horses	2,436
Mule	4
Donkey	9
Total	**35,867**

Table 6.7 Cattle population in Gerambamo PA by stage of growth, sex and production status

Cattle	No.
Cow	5,408
Heifer	5,620
Bull	3,583
Steer	3,315
Ox	399
Calf	2,725
Total	**21,050**

In 2007 community members told an interesting story about donkeys – they said that people in the PA viewed donkeys with suspicion. The first time a farmer brought a donkey to the PA it was shunned by the community, and women and children who had never seen a donkey before ran away from it in fright – even the cows and other livestock were said to be afraid of it! Though this was not mentioned in 2016, it would seem that the suspicion is still there as according to the above livestock figures there are still only 9 donkeys (and 4 mules) in the kebele despite their usefulness as pack animals.

The community said that they get many benefits from the livestock and livestock products. They consume the products of livestock as food such as milk, meat, eggs, etc.[61] They do not only obtain milk from cows, but also from goats and sheep. Goats milk tends to be given to children, and sheep/cow's milk used for coffee. They also sell the livestock and livestock products to purchase clothes for their children and themselves. In most cases goats and sheep are used for food in the form of meat in the household, in addition to marketing them. The oxen are also used for ploughing on the farmlands. Horses tend to be used for transporting humans and goods to and from market and/or town. They can also be used as draught animals (NEGE_FGMx_01). There can be a scarcity of livestock feed in the dry season, and as such livestock tend to be in poor condition and producing little milk, resulting in lower prices for them and less income from their products.

[61] In 2007 it was mentioned that more livestock products are produced at the end of the rainy season when a grass type called *qunni* flowers.

Livestock do not tend to be sold during harvest time as the community has enough to eat. The most common time to sell livestock is the month or two prior to harvest time in order to purchase grain and other foodstuffs. Livestock are also in demand at times of religious and other festivals or celebrations – and the price of livestock can be high at this time.

Generally speaking there have been improvements in the amount of income people earn from their livestock. Before ten years and individual herder could earn only about 4,000 Birr from his livestock; whereas today a livestock herder can earn around 10,000 Birr. Consumption of livestock products is less than it was ten years ago as more are sold – this is due to a change in eating habits as well as in an effort to raise income. Women in particular are very active selling milk and butter.

Livestock dung Is used as a fertilizer on crops. It can also be used as fuel.

According to the community (NEGE_FGMx_01), due to the expansion of vaccination services the types and incidence of disease in the kebele is minimum. Sometimes diseases will happen at the start and end of the rainy season (i.e. when the weather changes). Diseases associated with poisoning from plants usually happen in the wet season. Generally diseases like Black leg, Pasturollosis, FMD, diseases caused by liverfluke worm, and gastro-intestinal diseases are types of diseases known in the kebele. Most of these occur in the months of September, November and December. When animals are sick they can be taken to the veterinary clinic or call for treatment (NEGE_KIM_01; NEGE_FGMx_01).

Artificial insemination does not tend to be used and rather livestock keepers tend to rely on more tradition methods by placing a bull with a cow when ready for mating. After the cow has become pregnant they put it in a separate enclosure or *(kalo)* for grazing. They also prepare a suitable and clean shelter for the cow to sleep during the night: this helps them get a good size and healthy calf. At this time they put the calf for free suckling so as to get enough colostrum. Lactating cows are also put in a clean and good shelter, and are kept in a separate enclosure or *kalo* around their homestead so as to get enough grass. Once two months old, calves are kept in a separate safe enclosure allowing them access to good green forages for good rumen development and to avoid competition over grazing/or pasture by other older animals. They can still be allowed to suckle from the cow at the same time milking is carried out (NEGE_FGMx_01).

Though conflicts with wild animals used to be fairly common, today it is not because the destruction of the forest the number of wild animals has reduced. Livestock thievery however is something that increased over the last few years. Cattle and horses were the major target. Sometimes 80 horses could be stole at a time. And one day 5 cattle were lost. Today the stealing has reduced due to better communication facilities, road access, condemnation by religious leaders, the establishment of community level committees active in supervising and identifying who is doing what in the area including the appearance of any new or strange persons in the *kebele.* Respondents said that today there is no place to move with stolen livestock and if it happens, it can be easily detected.

There is a livestock market in Gerambamo *kebele* itself that serves the residents of the kebele and the surrounding kebeles in the woreda and adjacent woredas such as Kofele, Adaba, Dodola, Gedeb Asasa, and Shashemene. Livestock owners bring their livestock to the market in the town along different routes. This is one of the opportunities the livestock owners in the

kebele enjoy at present. In addition to Gerambamo livestock market they also use Negele Metama (in Dodola woreda) and Gata (in Kokosa woreda).

6.4 Synthesis and future scenarios

In Nensebo woreda there is clear indication of further intensification of land use – a trend that was already clearly seen in 2007. Though respondents said that livestock numbers have declined over the years, the livestock figures from the woreda suggest otherwise, with an approximate 50% in cattle, and nearly quadrupling of shoats. Though there could be some mistakes in the data, particularly from 2000, it would suggest that though land for grazing has reduced, communities have intensified the use of the remaining land in a productive manner including zero grazing, cut-and-carry, and supplementing grass with agricultural by-products.

In Solana, community members said that there was not a problem of quantity of forage for the number of livestock owned, however the quality is highly variable. Though in the wet season there is plenty of good green grass to feed the livestock, in the dry season they are forced to rely on enset and barley/maize/teff straw, which is not of good nutritional value. Despite this in both Solana and Gerambamo the fattening of livestock for sale appears to be a fairly lucrative business, particularly with the improved access to market – a key reason for farmers to increase livestock numbers. Despite this members said that they only tend to sell livestock when there is a specific need for finances.

In Solana in particular, the number of livestock is lower than in Gerambamo, with community more reliant on the growing of crops, which have increased in their variety since 2006. The growing of coffee, rather than relying on wild coffee is another relatively new experience, not seen in any other kebele in this research study. For the community members of Solana coffee is their main income-earner. The community is also one of few to be using chemical fertilisers as well as compost to improve productivity.

In both Solana and Gerambamo those with more land and less livestock are renting their excess land to those with grazing/grass needs. This is a practice that has been carried out for some time but increasing as the holding of livestock becomes more consolidated.

Community members seemed optimistic about the future of their livelihoods in both PAs, with youth involved in agricultural production including both livestock and crops. In general it would appear that incomes have increased, and to a degree that allows some to save money. The improved infrastructure, roads and communication in the area has been a key factor in this opening up markets. There also appears to be a good livestock extension system in the area and reasonable veterinary care – nearly all respondents said that livestock diseases had reduced in the area because of improved vaccination programmes.

7.0 ANALYSIS AND CONCLUSIONS

The Bale Mountains EcoRegion has a rich history of livestock production. Despite a number of challenges livestock remains the mainstay of the majority of livelihoods in both highland and lowland areas. Though movements across the altitudes still exist particularly amongst communities in the southern parts of the region and who take livestock up to forest areas in the dry season from drier lower parts, the movement of livestock today in most areas is more opportunistic and in response to available resources than the more predictable *godantu* movements of the past.

Figure 7.1 Livestock grazing on the high Sanetti Plateau

This study has shown that trends seen ten years ago including increasing cultivation of land including grazing areas, loss of local control of land to investors and the National Park (and more recently the Oromia Forest and Wildlife Enterprise), as well as intensification of livestock production and diversification of livelihoods have all intensified. Some communities also complained about changing climate, reduced rainfall and higher temperatures (Berak PA, Erba PA).

According to the wealth ranking, most PA communities have seen an increase (if only slight) in overall wealth status. This was particularly the case in Fasil Angesso PA where livestock numbers had seemingly increased even though crop farming was also more prevalent. A likely reason for

this is that the livestock keepers have been able to take their livestock up to the Sanetti Plateau where their most important (high quality) grazing is found. However if the BMNP is to carry out its threats of excluding livestock in this area, this will prevent such use and in the face of no alternatives it will likely have significantly negative impacts on Fasil Angesso community's livelihoods. Some PAs however are facing more challenging conditions including Hilassa PA in Goba woreda, where poverty levels appear to have increased over the decade. Seemingly this is a result of reducing productivity of land for crop farming and a lack of alternative grazing for livestock, contributing to the poor livestock productivity levels seen.

At the same time communities are struggling to maintain control of their lives (including food and land security), population growth, access inputs and extension services to improve their livestock production and deal with diseases and new threats such as invasive species, and maintain access to the resources important for their livelihood systems. Conflicts between land users are increasing, including between communities that in the past willingly shared land and resources including grazing. To a degree this has seemingly been aggravated by well-intentioned interventions by NGOs. In those communities that are better-off and are closer to towns (such as those in Goba woreda) the going of children to school has increased in importance and occurrence.

In Berak PA, a community rich in grazing areas and traditionally a host for many neighbouring livestock in the wet season, has seen large sections of its land taken out of community control and use, and provided to investors for growing of crops and such as biofuels. This was a process started in the early 2000s, and during the study in 2007, community members were already complaining about the situation. With the increase loss of grazing lands, community members have started growing more crops and are beginning to enclose and increase regulations on the remaining grazing areas. Today Berak's livestock keepers face conflicts with the investors (secretly releasing their livestock on the investors' land in protest), and with visiting communities from other areas who arrive in Berak still expecting to use the grazing as they have for decades but now faced by community by-laws and rotational grazing practices. Unless something is done to resolve the situation then conflict is likely.

Human population has grown significantly in the last 9-10 years. See Table 7.1. Unfortunatley humans are often accompanied by domestic dogs that pass disease to the Ethiopian wolf of which there are only approximately 150 in number in the Bale Eco Region. Dogs pass diseases cuch as canine distemper and rabies to the wolves, the effect of which was most recently seen in a distemper breakout in 2016 killing off a significant number of wolves (see Figure 7.1).

Table 7.1 No. of households in research woreda in 2007 and 2016

	Households	
Woreda/kebele	**2007**	**2016**
Delo Mena		
Erba	547	1,176
Berak	560	1028
Harena Buluk		
Sodu Welmal	187	732
Melka Arba	286	1338
Goba		
Fasil Angesso	253	351
Hilassa	297	563
Ashuta	482	650
Nensebo		
Gerambamo	91	1020
Solana	154	1021

Source: Kebele Adminstration offices

Note: These figures should be treated with caution as some appear incorrect and the source data had some other questionable aspects to it.

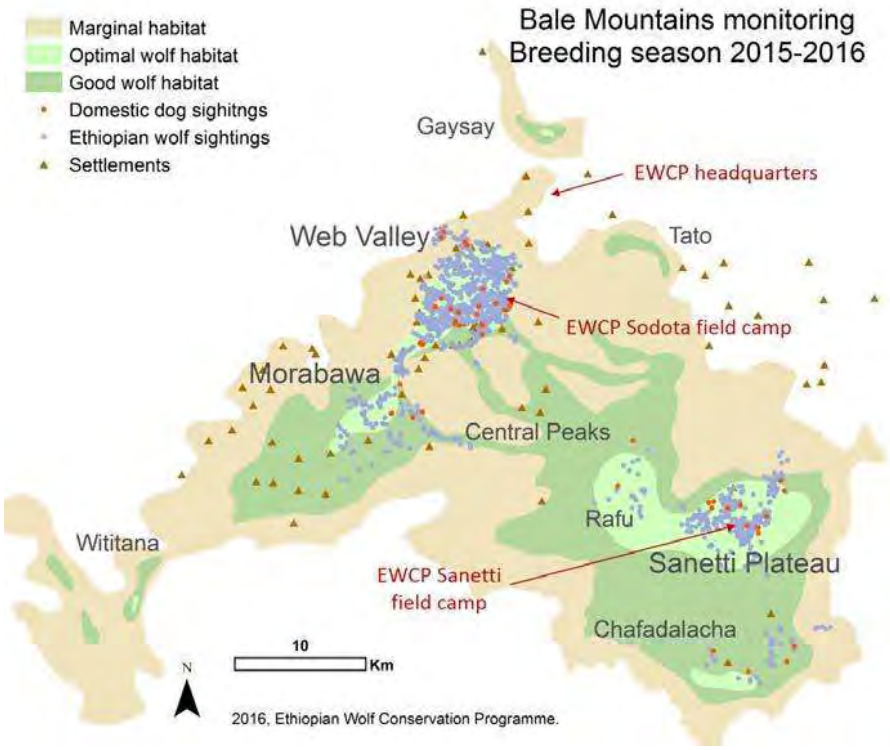


Figure 7.2 Sightings of wolves and domestic dogs during the 2015-16 wolfbreeding season. Source: EWCP 2016

A study carried out in 2016 of land use change between 1985 and 2015, using remote sensing and GIS, as well as data from the Central Statistical Agency on cropland and human and livestock population growth was undertaken across the Bale Mountains Eco Region. It showed that forest lost 123,751 ha while farmland gained 292,294 ha. Farmland and urban settlement expansion were found to be the biggest drivers of land use change. Forest cover loss until 1995 was less than 1000 ha per year, while after 1995, it increased to an annual loss of more than 5700 ha. The average annual loss of forest between 1985 and 2015 was more than 4500 ha. Farmland gained 50,271 ha between 1985 and 1995. Between 2005 and 2015, the gain of farmland was estimated at 103,320 ha. However, the average area added to farmland annually was estimated at about 10,575 ha. Shrubland also showed a similar trend to forests around 1995. Approximate annual losses of shrubland from 1985 to 1995, 1995 to 2005, and 2005 to 2015 were 2204, 6081, and 1023 ha, respectively. Patterns of loss of cover of grassland changed after 2006. Until 2005, the estimated annual loss of the area covered by grassland was 1,536 ha, which increased to 5,244 ha between 2005 and 2015 (Hailemariam et al 2016).

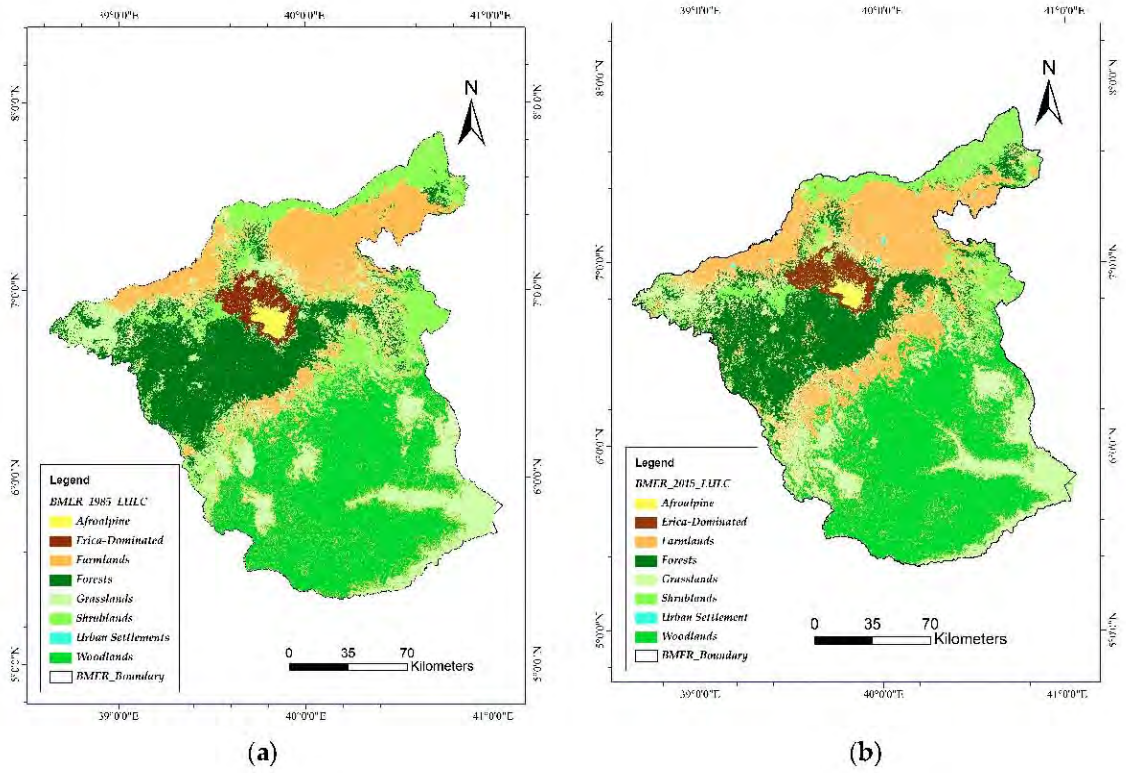


Figure 7.3 Land use change in the Bale Mountas Eco-Region between 1985 (a) and 2015 (b)

Most of the area lost from forests, grassland, and shrubland was converted to farmland. Between 1985 and 1995, an estimated 50,271 ha of new farmland was gained from forest (37.6%), shrubland (35.9%), and grassland (16%). In the following 10 years (up to 2005), farmland gained an estimated area of 138,703 ha from forests (48%) and shrubland (43%). However, between 2005 and 2015, the area conversion from shrubland to farmland declined to 9%. During the same period, forests and grassland were converted and contributed to farmland at more or less the same magnitude, i.e., 43.2% and 42.3%, respectively. Within the study period (1985–2015), the total area of forests, shrubland, and grassland converted to farmland was

estimated at about 123,751, 93,078, and 83,158 ha, respectively. During the same period, farmland gained about 292,294 ha (ibid).

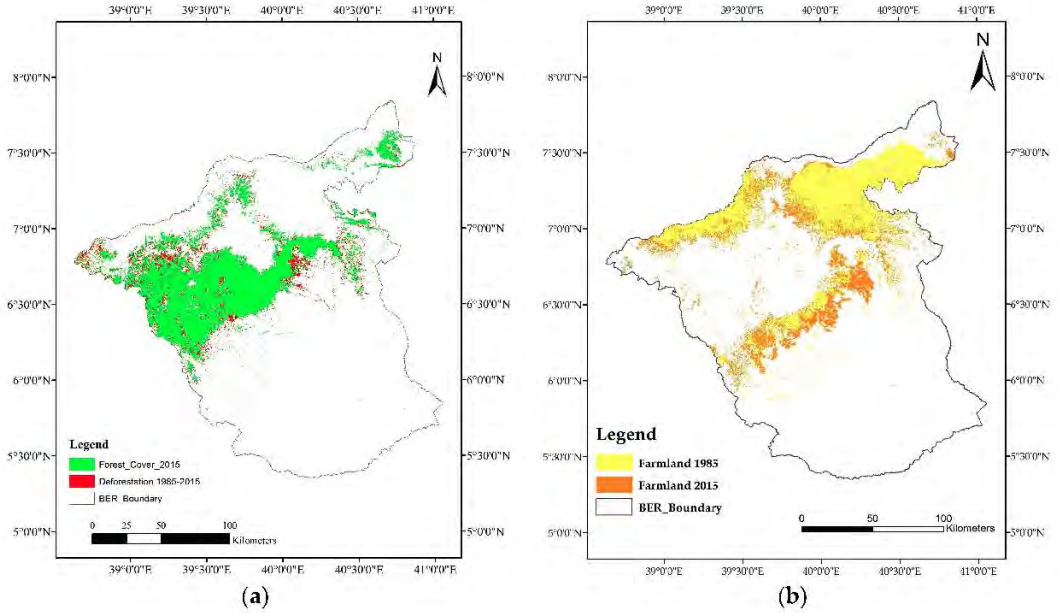


Figure 7.4 Deforestatoin (a) and farmland expansion (b) in Bale Mountains EcoRegion between 1985 and 2015 (Source: Hailemariam et al 2016)

The above study shows that 2.2% of grassland in the Bale Mountains EcoRegion between 1985 and 2015, as well as forests. Whilst livestock population has expanded at the same time – the pressure on remaining resources is signifiicnat. Livestock keeprs across the Region are complaining about these changes. All but those communities in Nensebo, complained that they have lost important grazing areas to crop production. Not only this, but crop growing often blocks migration routes meaning that it takes longer to move to those grazing areas still available and/or water sources. Community members are not adverse to crop growing, and indeed most respondents (apart from the very poorest) do grow some crops if only for subsistence. Local government has encouraged this with the provision of inputs, tools and extension services as well as an increase in markets and prices of agricultural products. See Figure 7.5 for a consolidation of the different livestock routes described by respondents in this study.

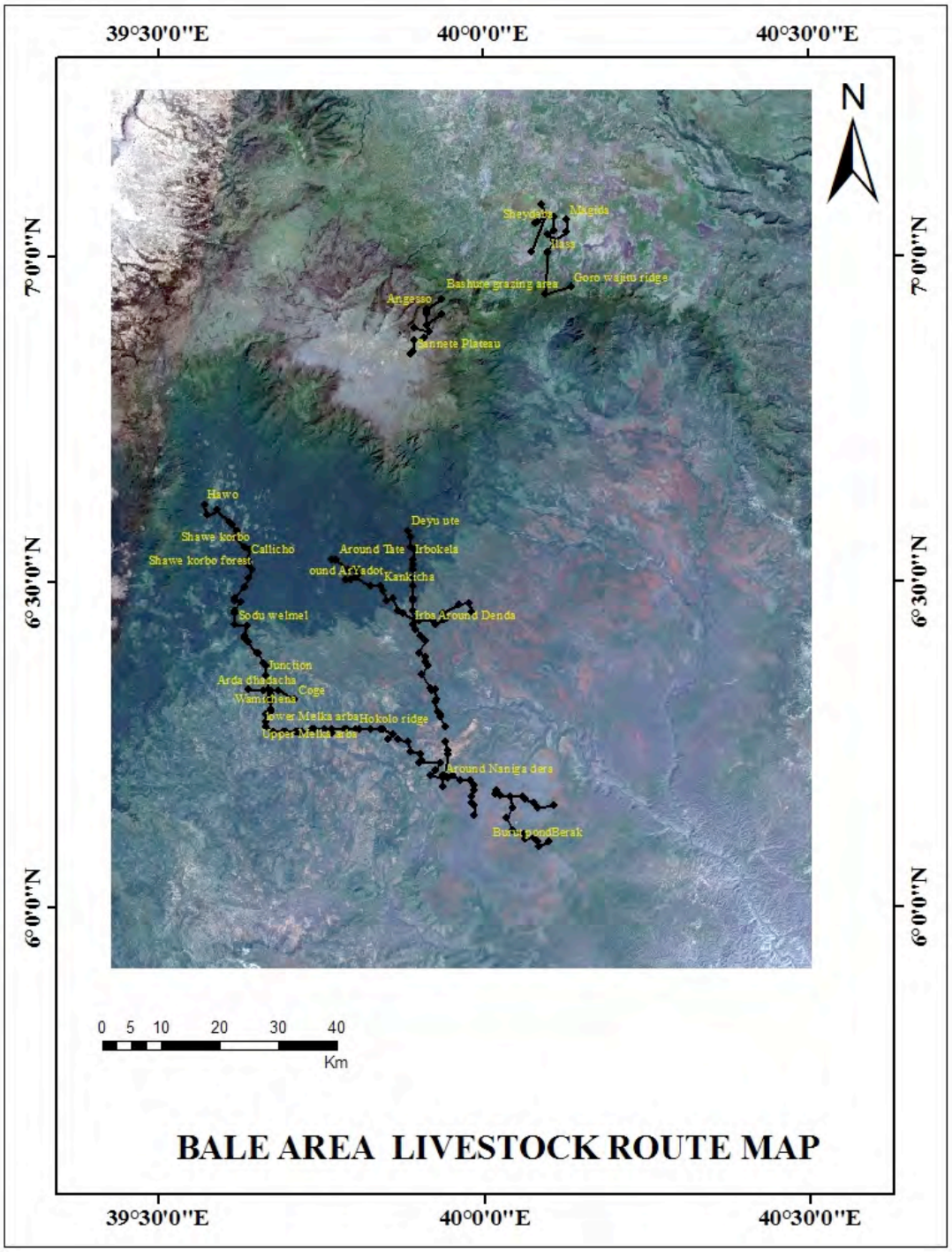


Figure 7.5 Livestock routes described by respondents in this study

However, though community members see the benefit of growing crops as well as livestock, they would like to see more extension services and support from government for livestock (and not only for crops). This was a complaint raised in the study in 2007, and though extension (including veterinary) services do have appeared to improved in some areas such as in Nensebo

woreda (where livestock disease appears to have significantly reduced), in others particularly those that are more isolated such as in Harena Buluk and Delo Mena woreda, and even in Hilassa PA in Goba, livestock extension services are close to non-existent or severely lacking. When asked, kebele government administration offices in the majority of PAs stated that they do have one land use administration expert, one livestock expert, and one agronomist – however as suggested by the communities the capacity of these experts to address all needs across the woreda is overwhelming and therefore the service that they provide is severely wanting. Community members blamed the lack of support for livestock as a policy issue from above, which meant that adequate resources were not allocated to livestock production systems and their improvement.

Additionally in all PAs where there were state or investor crop-growing farms, community members complained that the farms had introduced new plants (invasive species) into the area that was degrading grazing areas, and even poisoning livestock. Community members also mentioned a plant called *gonde* that grows in marshy areas and close to rivers, which causes sickness and death to cattle if they eat it. These new invasive species are increasing in their prevalence and need urgent attention. In most cases respondents said that livestock numbers per household had increased.

Having said that, across the zones, woreda and PAs that participated in this study livestock numbers have grown, and quite substantially in some cases, according to government figures. In Bale zone (as shown in Appendix 1) cattle numbers have increased from 2,290,163 in 2000, 1,635,302 in 2007 to 2,825,215 in 2015. Shoats have increased from 653,676 in 2000, to 640,498 in 2007 to 1,934,461 in 2015. Equines have increased from 234,379 in 2000 to 210,036 in 2007 to 519,887 in 2015. And camels have increased from 67,956 in 2000, to 125,782 in 2007 and to 226,616 in 2015.

In Goba woreda figures suggest state that by 2015, total livestock numbers were said to be total of 190, 726 heads, made up of 95,715 cattle, 74,04 shoats (mainly sheep), and 20,957 equines, around 25% increase from 2007. Though the number of cattle has increased only slightly, it is the number of shoats that have increased most significantly - by a factor of six between 2000 and 2007, and again doubling between 2007 and 2015. If a comparison is made between 2000 and 2015 then shoats would have increased by a factor of 11.

Prior to 2007 Harena Buluk and Delo Mena were one woreda - Mena Angetu woreda. Total livestock figures of Harena Buluk and Delo Mena in 2015 were 723,269 heads of livestock made up of: 479,601 cattle, 160,731 shoats, 37,515 equines, 45,422 camels. This is a nearly 3-fold increase from 2007, and a 3.65-fold increase from 2000 with increases across all livestock types including cattle. In Harena Buluk alone livestock numbers in 2007 totaled 95,319 heads, made up of: 59,669 cattle, 23,673 shoats, 7,863 equines, and 4,114 camels. In 2015 these had increased to 232,377 heads of livestock made up of: 156,975 cattle, 54,917 shoats, 19,735 equines, and 750 camels giving a 2.5-fold increase on total numbers and with cattle increasing nearly 3-fold, shoats and equines over 2-fold, and camels reducing significantly. The reason for the fall in camel numbers was not clear. Most significant is the increase in cattle.

In Delo Mena alone, total numbers of livestock heads in 2007 was 154,409: this was made up of 102,324 cattle, 26,097 shoats, 6412 equines and 19,576 camels. In 2015 this had increased to total number of 490,892 heads, made up of 322,626 cattle, 105,814 shoats, 17,780 equines and 44,672 camels. This is a more than 3-fold increase (i.e. in eight years) with increases across all

livestock types, including a more than 4-fold increase in shoats (mainly goats). This is very surprising considering the increased pressures on grazing, and the conversion of much land to crop farming.

Livestock populations of the woreda in 2000 stood at 100,617 cattle; 17,252 shoats; and 6,210 equines, which equals 76,194 TLU or 124,079 heads of livestock. No 2007 data was obtained. The total number in 2015 however was 251,845 heads, made up of 156,353 cattle, 70,777 shoats, and 24,715 equines. This shows a doubling of livestock numbers over the 15 years, with a lesser increase in cattle numbers (only 50%), but a 4-fold increase in the number of shoats and equines. This is not surprising given the more sedentarised living in the woreda with a large amount of cattle kept in more intensified zero grazing systems, whereas shoats in particular are able to browse on remaining resources more easily.

Where land pressures prevent livestock movement, this has led to the replacement of grazing with zero-grazing systems (Solana PA and Ashuta PA), supplementation with cut-and-carry of grasses (Gerambamo) and the increased feeding of fodder and forage including crop residues, plants, enset and other. In some PAs including those in Nensebo woreda (Gerambamo and Solana) the fattening of livestock in enclosures is now an important contribution to local livelihoods. The opportunity to do this has been increased by improved infrastructure in the area. However, most communities say that the fodder and forage are poor substitutes for grazing/grass and is reflected in lower productivity of livestock in some cases. The feeding of feed concentrates to livestock was hardly mentioned. In addition the introduction of 'improved' breeds has been seen over the last decade, though these are mainly dairy animals. Though the marketing of livestock has increased however, in nearly all cases those interviewed said they only sell livestock when there is a specific need e.g. to pay medical fees, school fees, or for a cultural event such as funeral or wedding.

In general water access was not a problem, and though some community members mentioned it took longer to take livestock to water points in areas where there is increased farming, in general most communities have access to water all year round (excluding severely and unusually dry months). In addition the use of *hora* and *haya* is still common providing important health-giving minerals for the livestock. Though some *haya* have been lost to agriculture since 2007, it would seem that the majority of both *haya* and *hora* are still in use. Where communities do not have access to the natural salt sources and/or where livestock do not move (i.e. in Nensebo), mineral supplements are purchased (said to be soda-based minerals from the Rift Valley Lakes called *bajji*), mixed with soil and feed to the livestock. Where veterinary services are available they appear to be well-used by community members, including vaccination. There appeared to be little introduction of improved breeds in the more highland areas, though they were mentioned in Goba and Nensebo (i.e. where more intensification of livestock production has taken place).

The lack of security to land and resources is an underlying cause of many of the problems that the community face. Government promotes individual land holding over communal, reflected in the strong drive in the area to allocate and certify individual plots of farming land to individuals/households. However communal lands including those remaining grazing areas that many livestock keepers depend upon remain unregistered/certified. Further, because livestock are moved to different areas for wet and dry season grazing the land is left 'vacant' for part of the year. Local government argues that this land could be put to better productive use, and with no certified owner, the government can easily allocate that land to other users such as investors

or to landless youth. In some PAs e.g. Ashuta in Goba, the government is encouraging the community to pay for grazing; and in Solana and Gerambamo the leasing of grazing to other uses is a common occurrence. The renting of draught power (oxen) is common in the crop farming areas.

The introduction of PRM (participatory rangeland management) in Berak PA by FARM Africa and SOS Sahel, has to a degree legitimized local land use including grazing and contributed to securing the land for the community, following a management plan and regulating bylaws, with a resource user agreement established between the local PA government and the designated cooperative(s). However as described above, the increased formalisation and control of access to these grazing areas (traditionally used by many neighbouring communities in the wet season) is now leading to conflicts between the Berak PA and the visiting secondary users. This situation demands the introduction of a more watershed or landscape planning approach that considers land and resource use across the whole Bale region, the implications of one intervention in one place on others in the region, and how best negative impacts of such an intervention can be prevented and/or mitigated.

Forest encroachment from farming was an issue of significant importance for many communities and particularly those that use the forest areas for grazing. This had not only lead to problems in access resources as well as a degradation of those resources because higher numbers of livestock are using less available, but also conflicts between herders and the crop (including crop) farmers. Though the Oromia Forest and Wildlife Enterprise state that they support community-based/participatory forest management, the complaints of the community suggest otherwise and the OFWE would rather appear to be seeking to restrict/prevent the access of the community rather than working with them to manage the forest areas. This seems to be a lost opportunity for a win-win situation where the OFWE would benefit from the community helping manage the forest, and the community benefiting from keeping access to it.

However, the most important issue for many of the communities, particularly those bordering BMNP (including Erba PA-Delo Mena, and Fasil Angesso-Goba), is the recent designation of the Park and plans to demarcate the boundaries and exclude herders and their livestock from grazing inside. This was the most heated issue discussed, with community members highly aggravated and increasingly resentful, and seemingly willing to take all measures to maintain access. They said that this situation should never have arisen as in the past they have protected the Park and such as the Ethiopian Wolf, and are still willing to do so. Indeed when approached it is usual for local communities to cooperative with vaccination campaigns of domestic dogs to prevent spread of disease to the wolves. Yet communities have been left out of decision-making processes about the Park, and now these recent moves to exclude them and their livestock reflect a complete lack of regard for them, their livelihoods and their willingness to participate in the management and protection of the Park. They believe that if the Park was to work with them then compromises and solutions could be found that will benefit all. A good solution would seem therefore that the Park authorities and supporting NGOs such as Frankfurt Zoological Society improve opportunities for the participation of willing communities in Park decision-making and management, and compromises/agreements are established allowing limited and regulated use of parts of the Park (e.g. priority grazing areas) and its resources.

The BMNP Designation Council of Ministers Regulation No. 338/2014 states that an Advisory Committee for the BMNP should be established and will meet every three months. This should include such as the Head of the Office of the Park, but also should include chief administrators

of the Park's neighbouring woredas; heads of the Park's neighbouring kebele administrations; representatives of the Park's neighbouring woreda community elders; and representatives from youth and women associations of neighbouring kebeles. The duties of this Committee would be to "advise the office of the Park in carrying out its duties and responsibilities; advise the office of the Park to enhance the contribution of the local community around the Park in the management and conservation of the Park with a sense of ownership; and prpare annual plans of the Park together with the office of the Park" (Art. 7: 1-3, Regulation 338-2014). However to date this Advisory Committee has not been established. If it was established this would be one of the forums where neighbouring communities could at least have a say in the BMNP. The Regulations also states that penalties should be administered on those who cause damage to wildlife or wildlife resource, and on those who allow domestic animals to transgress into the Park "taking into account the financial capacity of the local communities."

An important future development for the region in the future would be land use planning at different levels. Currently the Oromia Water Works Supervision Development Enterprise is producing a land use plan for the Bale zone. The document was not finalized in time for review in this study, but it will likely have strong implications for future land use in the area, prioritizing different land uses in different areas. Additionally there are opportunities for lower levels of land use planning through the government structures e.g. at woreda level, as well as at community level – and already being carried out in Berak PA supported by the PRM process. A key component of such land use planning should be considering different scenarios e.g. with or without grazing in the National Park. In addition a more indepth and quantitiative as well as qualitiative study of livestock numbers and movements across the whole Bale Mountains Eco-Region (including a detailed livesetock population census) is required.

A major issue is what is the 'carrying capacity' of the land – however if this is to be properly calculated then it needs to be done on a scale of the whole landscape so that the different parts of the landscape and their relevance for livestock production at different times of the year and other factors are taken into account, together with movement between these. Such movement is important for ensuring cattle in particular remain healthy and productive in the challenging environment across the different altitudes and climates, so preserving the more beneficial components of the extensive livestock production that has a comparative advantage in the region: both in terms of production and in terms of conservation, grasslands if well-managed are more beneficial to the environment than crops. If such land use planning processes are implemented in a participatory, inclusive way involving all land users, with possibilities for some consensus about future land use, then these processes could contribute to the resolution of many of the problems that were encountered in this study.

REFERENCES

Alemu, M. K. Suryabhagavan and M. Balakrishinan (2012) "Assessment of Cover Change in the Harenna Habitats in Bale Mountains, Ethiopia, Using GIS and Remote Sensing." International Journal of Ecology and Environmental Sciences Vol 38(1): 39-45.

Atickem, Angaw, Stuart Williams, Afework Bekele, Simon Thirgood (2010) "Livestock Predation in the Bale Mountains of Ethiopia" African Journal of Ecology, Vol. 48, Issue 4.

Ayele Gebre Mariam (1975) "The Forgotten Aborigines: Socio-Economic Survey in Southern Highlands. A Study of Farm & Livestock Systems in Southern Highlands of Ethiopia". Unpublished Report Prepared for the Imperial Ethiopian Government Livestock & Meat Board.

Ayele Gebre Mariam (1976) "Bale Sub-Highlands Socio-Economic Study" Unpublished Report to the Southern Highlands Livestock Development Project.

B&M Consultants (2004) DGIS-WWF Project Bale Mountains National Park & Mena-Angetu National Forest Priority Area: Main Report on Community Based Natural Resources Conservation (CBNRM) Unpublished Report, Addis Ababa.

Bale Mountains National Park (BMNP) (2006) General Management Plan 2007-2017. Compiled by the Oromia Bureau of Agriculture and Rural Development. Frankfurt: Frankfurt Zoological Society.

BMNP (2015) *BMNP Ecological and Threat Monitoring Programme. 2015.* Unpublished report.

Bekele Diriba (2005) Preliminary Farming System Survey Report of Madda Walabu, Manna Angetu & Barbare Districts of Bale Zone Unpublished Report for Sinana Agricultural Research Centre.

Bekele Hundie Kotu, Feyisa Taddese, Worku Jimma, Mengistu Yaddessa & Tesfaye Getachew (1997) Initial Results of Informal Survey of Gassera Mixed Farming System Area, Bale Zone Unpublished Report for Sinana Agricultural Research Centre.

Brown, L. (1969) "Observations on the status, habitat and behavior of the mountain nyala Tragelaphus buxtoni in Ethiopia." Mammalia, 33.170

FDRE (2014) Federal Negarit Gazette of the FDRE. Regulation No. 338/2014. Bale Mountains National Park Designation Council of Ministers Regulation. Addis Ababa.

Flintan, F. (2000) A Gender-Sensitive Study of Perceptions and Practices in and around Bale Mountains National Park Working Paper No. 1 for the 'Engendering' Eden Project.

Flintan, F., W. Chibssa, D. Wako and A. Ridgewell (2008) Livestock and Livestocck Systems in the Bale Mountains EcoRegion. Unpublished report.

Girma Amente (2005) Rehabilitation & Sustainable Use of Degraded Community Forest in the Bale Mountains of Ethiopia Ph.D. Thesis in Forest & Environmental Science, Albert Ludwigs University. Internet:www.freidok.uni-freiburg.de/volltexte/2302/pdf/PhD_thesis_Girma_v_7.pdf

Guilio, M. (2003) Conservation & Development in Ethiopia: Issues & Perspectives in the Bale Mountains National Park. M.Phil. Thesis in Environment & Development, University of Cambridge.

Hailemariam, S., T. Soromessa and D. Teketay (2016) "Land Use and Land Cover Change in Bale Mountain Eco-Region of Ethiopia during 1985 – 2015" Land Vol. 5: 41.

Helland, J. (2006) Land Tenure in the Pastoral Areas of Ethiopia. Paper presented to the International Workshop on Property Rights, Collective Action & Poverty Reduction in Pastoral Areas of Afar and Somali National Regional State, Ethiopia. Addis Ababa 30-31 October, 2006.

Hillman, J. C. (1986) Bale Mountains National Park Management Plan. Addis Ababa: EWCA.

Kidane, Yohannes, Reinhold Stahlmann, Carl Beierkuhnlein (2012) "Vegetation dynamics and land use and land cover change in the Bale Mountains, Ethiopia" Environmental Monitoring and Assessment, Vol. 184, Issue 12.

McCarthy, D. (1990) An Investigation into Several Aspects of the Use of Natural Mineral Springs (Horas) within and around Bale Mountains National Park, Southern Ethiopia MSc Thesis in Zoology, Leicester University.

Malcolm, J. & Evangelista, P. H. (2005) The Range and Status of the Mountain Nyala Unpublished Document.

Mamo Hebo (2005) Land Dispute Settlement in a Plural 'Institutional' Setting: The Case of Arsii Oromo of Kokossa District, Southern Ethiopia African Study Monographs, Suppl. 29: 125-35.

Marino, J., C. Sillero-Zubiri & D.W. MacDonald (2006). "Trends, dynamics and resilience of an Ethiopian wolf population" Animal Conservation 9: 49-58.

Miehe, S. and G. Miehe (1994) Ericaeous Forests and Heathlands in the Bale Mountains of South Ethiopia. Hamburg: Stiftung Walderhaltung in Afrika.

Mindaye Abebe (2005) The Oromo of Bale: A Historical Survey to 1974. MA Thesis in History, Addis Ababa University.

Oromia State Governant (2000) Socio Economic Profile, Bale Zone. Internet: http://oromiagov.org/Socio%20Economic%20Profile/bale/bale%20Zone.pdf

Sillero-Zubiri, C. and D. Gottelli (1995), "Diet and feeding behavior of Ethiopian wolves (Cansis simensis), Journal of Mammalogy, 76: 531-541.

Solomon Bogale, Bekele Mechalu & Dawit Abate (2005) Summary of Livestock Research Strategy for Bale Zone (Feed Resources, Dairy, Small Ruminants, Animal Health & Apiculture Research Programs Sinana Agricultural Research Institute.

Solomon Bogale, Solomon Melaku & Alemu Yami (undated) Crop-Livestock Interactions in the Highland Farming Systems: A Case Study in the Bimodal Rainfall Areas of Bale, Southeast Ethiopia. Unpublished Document.

WAAS Consultants (2005) Conservation & Sustainable Use of Medicinal Plants Project: Review of Analysis of Studies Made on Bale Mountains National Park. Unpublished Consultancy Report for the Institute of Biodiversity Conservation.

Watson, C. (2007) Direct Consumptive Use Valuation of Ecosystem Goods & Services in the Bale Mountains Eco-Region, Ethiopia M.Sc. Thesis in Environmental Policy, Imperial College London.

Wakjira, D.T.; D'Udine, F.; Crawford, A. Migration and Conservation in Bale Mountains Ecosystem. 2015. Available online: https://www.iisd.org/sites/default/files/publications/migration-conservation-balemountains-ecosystem-report.pdf

Yoseph Assefa, K. Wesche and Masresha Fetene (undated), The Status of the Ericaceous Vegetation on the Southern Slope of the Bale Mountains.

APPENDIX 1: LIVESTOCK POPULATION IN BALE ZONE BY WOREDA IN 2000, 2007 AND 2015

Comparison of livestock populations between 2015, 2007 and 2000 where figures were available

	Cattle			Shoats			Equines			Camels			Total numbers		
	2000	**2007**	**2015**	**2000**	**2007**	**2015**	**2000**	**2007**	**2015**	**2000**	**2007**	**2015**	**2000**	**2007**	**2015**
Bale zone	2,290,163	1,635,302	2,825,215	653,676	640,498	1,934,461	234,379	210,036	519,887	67,956	125,782	226,616	3,246,174	2,611,618	5,506,179
Selected woreda															
Goba	74,397	88,038	95,715	6624	39,129	74,054	17,711	26,806	20,957	0	0	0	98,732	153,973	190,726
Dola mena	145,850	102,324	322,626	33,939	26,097	105,814	5906	6412	17,780	11,953	19,576	44,672	197,648	154,409	490,892
Harenna Buluk		59,669	156,975		23,673	54,917		7,863	19,735		4114	750		95,319	232,377
West Arsi zone	N/A	N/A	284,001	N/A	N/A	1,423,745	N/A	N/A	481,733	N/A	N/A	9	N/A	N/A	2,189,488
Selected woreda															
Nensebo	100,617	N/A	156,353	17,252	N/A	70,777	6210	N/A	24,715	0	N/A	0	124,079	N/A	251,845

A. Livestock Population of Bale zone by woreda in Year 2015 (Zone, Livestock and Fishery Development Agency, Robe 2015)

Woreda	Cattle	Shoats		Equine			Camel	Poultry
		Sheep	Goat	Horse	Mule	Donkey		
Agarfa	229,206	46,070	29,634	11,810	4,983	16,984	0	40,150
Berebere	311,881	14,931	155,265	838	17,128	28,045	8,133	132,755
Dinsho	69,515	80,498	8,859	18,461	358	6,949	0	25,666
Gasara	128,266	17,560	17,301	6,112	1,298	11,037	0	32,349
Gindhir	204,278	17,121	61,742	2,501	3,571	28,813	4,650	75,981
Gololcha	161,830	11,101	49,679	1,632	3,295	21,592	2,990	39,210
Gobba	95,715	63,405	10,649	11,225	2,151	7,581	0	17,642
Goro	135,742	8,789	25,371	1,960	3,994	10,922	1,684	26,757
Sinana	287,825	55,978	15,769	9,200	2,820	14,000	0	60,000
Dalo Mena	322,626	14,912	90,902	13,994	1,275	2,511	44,672	50,665
Dawe Kachan	89,184	35,563	100,725	5,647	35	269	20,289	10,472
Dawe Sarar	51,393	53,381	114,145	11,212	10	50	38,588	9,420
Gura Dhamole	88,512	13,721	39,378	5,893	333	1,129	4,639	8,454
Harena Buluk	156,975	7,782	47,135	8,706	5,753	5,277	750	38,881
Laga Hidha	175,100	14,800	252,000	160,100	6	9,340	38,700	23,314
Madda Walabu	213,962	11,901	233,020	7,873	1,541	4,775	19,446	133,249

Rayitu	50,355	31,733	92,151	13,163	811	294	39,992	4,653
Sawena	52,850	29,500	61,990	9,750	295	585	19,540	18,044
Total	**2,825,215**	**528,746**	**1,405,715**	**300,077**	**49,657**	**170,153**	**244,073**	**747,662**

Source: Bale Zone Livestock and Fishery Development Agency Office

B. Livestock Populations of Bale zone by woreda in Year 2007 (Zonal Agricultural Office, Robe 2007)

				CATTLE					SHOATS			EQUINES			CAMELS	TOTAL
Woreda	**Oxen**	**Steer**	**Cow**	**Heifer**	**Bull**	**Calf**	**Sub Total**	**Sheep**	**Goats**	**Sub Total**	**Horse**	**Donkey**	**Mule**	**Sub Total**		
Agarfa	35013	400	41649	25169	23954	15640	141825	27780	27581	55361	5111	10750	1948	17809	0	214995
Berbere	10144	5100	17775	20333	5100	20222	78674	1008	86274	87282	174	7284	2790	10248	1831	178035
Delo Mena	6079	2932	50867	24448	6261	11737	102324	4596	21501	26097	1199	4512	701	6412	19576	154409
Dawe Kachen	5458	0	7219	9900	9057	10700	78674	3562	18186	21748	73	2937	563	3573	7154	111149
D/Sarer	NA	NA	NA	NA	NA	NA	6400	5708	17492	23200	0	2571	9	2580	5822	38002
Dinsho	9542	474	54806	8058	7130	12892	92902	43434	4169	47603	10995	2238	1050	14283	0	154788
Gassera	15753	1575	24629	11377	14315	12341	79990	15753	17328	33081	7877	8758	6302	22937	0	136008
Gindir	27618	1165	59723	31859	836	20479	141680	5648	19957	25605	583	13236	834	14653	407	182345
Gololcha	8477	6935	31904	23898	19044	23334	113592	2601	23409	26010	44	8606	629	9279	813	149694
Goba	15680	981	33746	10268	9693	17670	88038	31083	8046	39129	18193	6334	2279	26806	0	153973
Goro	25676	0	55440	25917	21254	23701	151988	7787	3733	11520	1555	8746	3429	13730	9829	187067
Gura Damole	2917	239	11795	5991	2433	4125	27500	755	7090	7845	279	1450	204	1933	2550	39828
Herena Buluk	3647	1086	21531	11231	9521	12653	59669	4710	18963	23673	2709	3952	1202	7863	4114	95319
Laga Hida	10312	13258	45668	26517	23572	27990	147317	5671	57128	62799	0	11607	6328	17935	23119	251170
Meda Walabu	9048	4530	30143	9585	14177	14264	81747	3672	59559	63231	10	2766	937	3713	16227	164918
Raitu	2165	0	9023	5065	2333	3864	22450	11508	22661	34169	181	4045	41	4267	9020	69906
Sewena	14502	0	15210	7476	7562	7032	51782	13948	4260	18208	2	4136	243	4381	25320	99691
Sinana	40701	2076	45264	32646	23665	24398	168750	19486	14451	33937	4134	20579	2921	27634	0	230321
Total	242732	40751	556392	289738	199907	263042	1635302	208710	431788	640498	53119	124507	32410	210036	125782	2611618

NOTE - The cattle sub total for Dawe Kachen is incorrect but has been maintained so as not to alter the rest of the data.

C. Livestock Population in Bale zone by woreda in 2000 (Oromia government 2000).

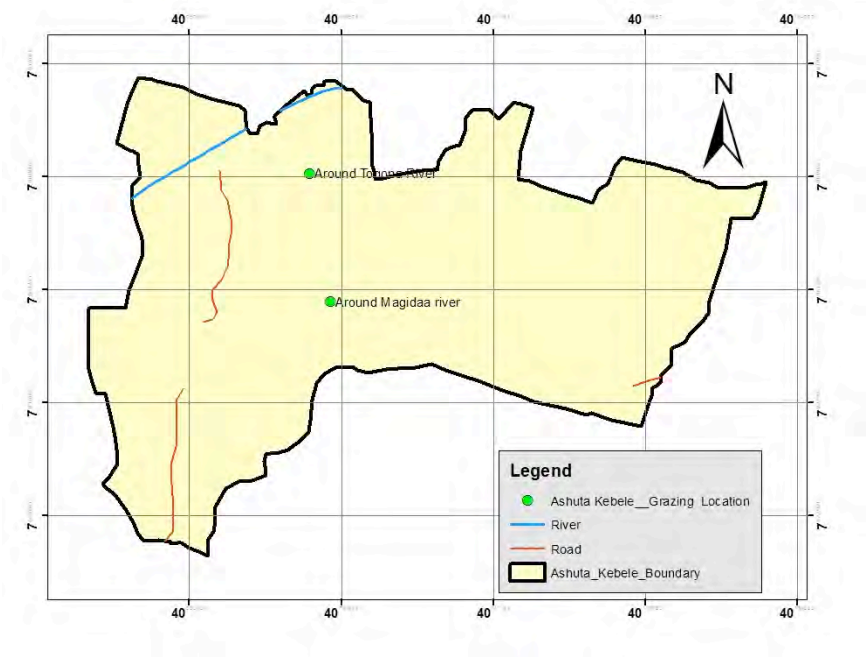
			SHOATS			EQUINES				
Woreda	**CATTLE**	**Sheep**	**Goats**	**Sub total**	**Horse**	**Donkey**	**Mule**	**Sub Total**	**CAMELS**	**TOTAL**
Adaba	176187	48349	20529	68878	14034	12001	530	26565	0	271630
Agarfa	130914	12225	10867	23092	3112	7732	1033	11877	0	165883
Beltu Laga Hida	103851	7795	2055	9850	0	2055	391	2446	16313	132460
Berbere	74500	3850	26400	30250	NA	NA	NA	4752	2210	111712
Dodelo	266619	42336	10273	52609	NA	NA	NA	38648	0	357876
Gasera Gololcha	307561	5934	56158	62092	4301	10100	2864	17265	393	387311
Ginir	186486	7374	37067	44441	NA	NA	NA	10692	0	241619
Goba	74397	1899	4725	6624	9263	832	7616	17711	0	98732
Goro	144606	3339	18203	21542	2061	4224	1329	7614	4048	177810
Gura Damole	63173	NA	NA	42000	NA	NA	NA	1580	3200	109953
Kokosa	192397	51672	23310	74982	43089	601	197	43887	0	311266
Meda Walabu	66069	50757	1711	52468	0	2249	616	2865	17509	138911
Mena Angetu	145850	3973	29966	33939	367	4394	1145	5906	11953	197648
Nensebo	100617	15620	1632	17252	NA	NA	NA	6210	0	124079
Raitu	5978	5978	7738	13716	NA	NA	NA	6636	9830	36160
Sewena	63440	5000	22000	27000	NA	NA	NA	2514	2500	95454
Sinana Dinsho	187518	56533	16408	72941	NA	NA	NA	27211	0	287670
Total	2290163	322634	289042	653676	76227	44188	15721	234379	67956	3246174

Note: In the year 2000 some woreda such as Harena Buluk and Delo Mena did not exist in their own right, but were part of other woreda. Therefore it has not been possible to calculate compare their livestock population figures.

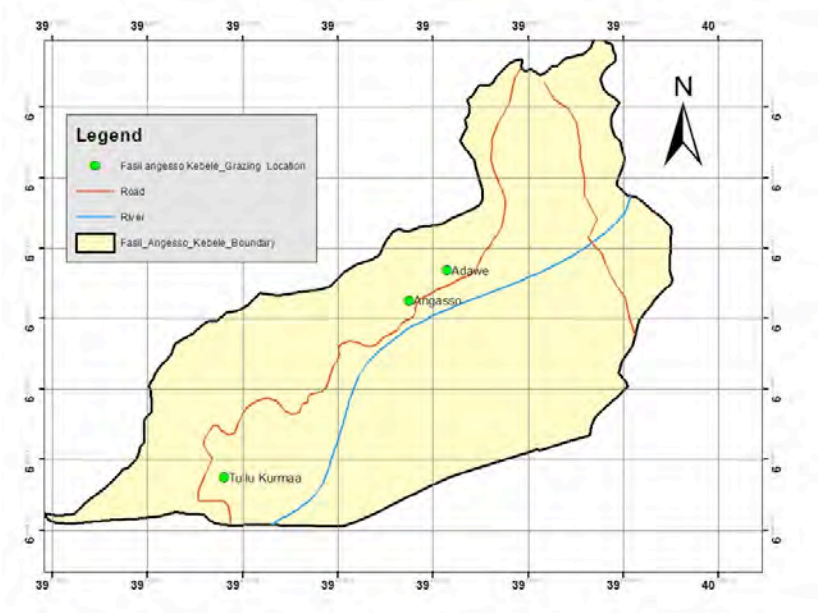
APPENDIX 2 DIGITISED MAPS OF GRAZING AREA LOCATIONS

1. GOBA WOREDA

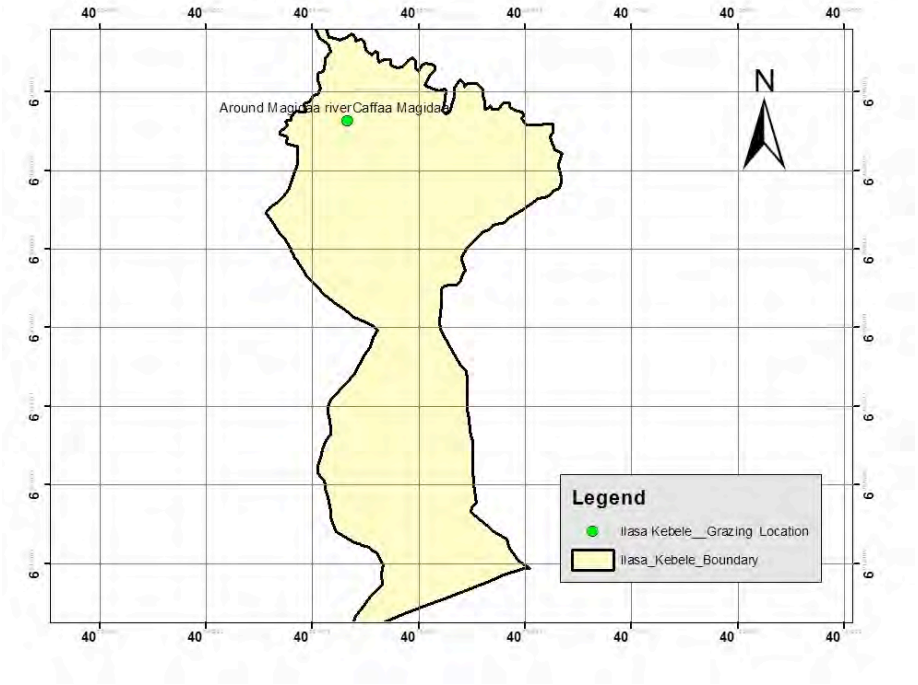
Ashuta PA



Fasil Angesso PA

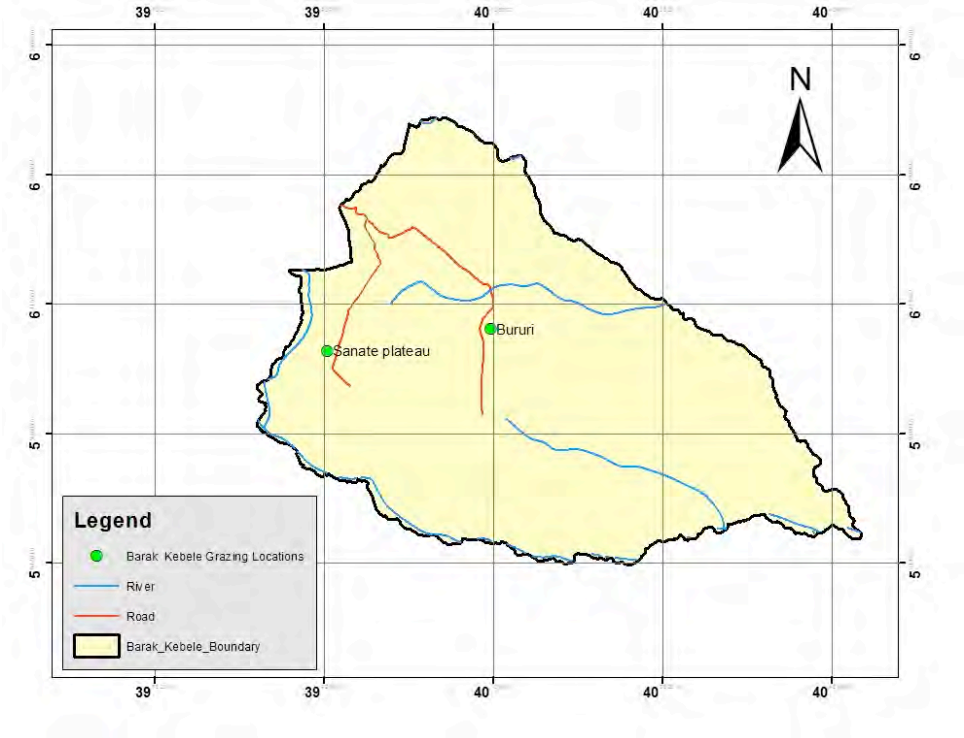


Hilassa PA

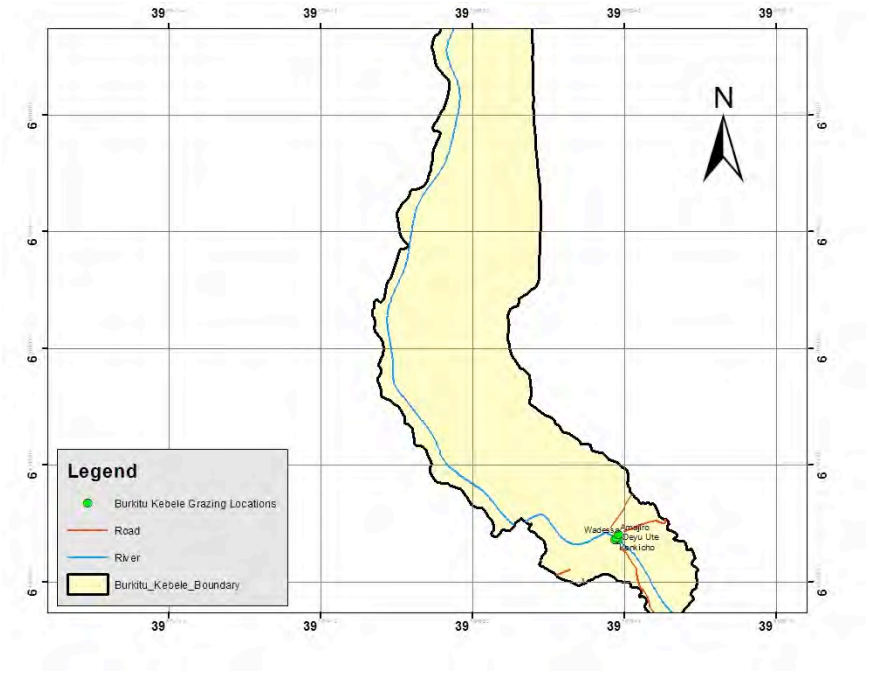


DELO MENA WOREDA

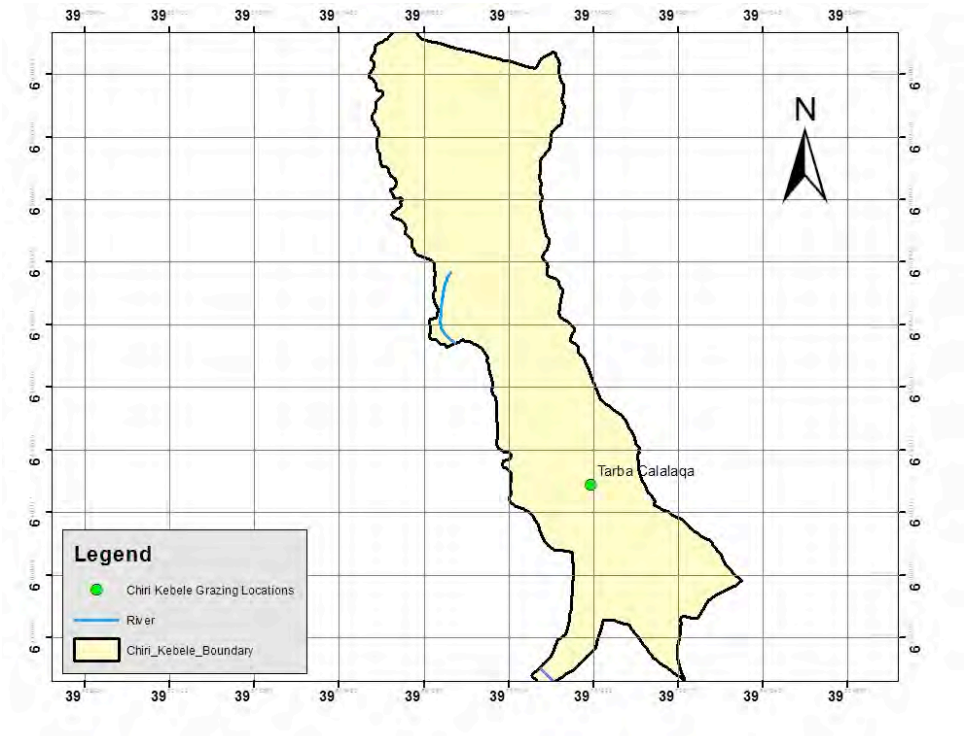
Berak PA



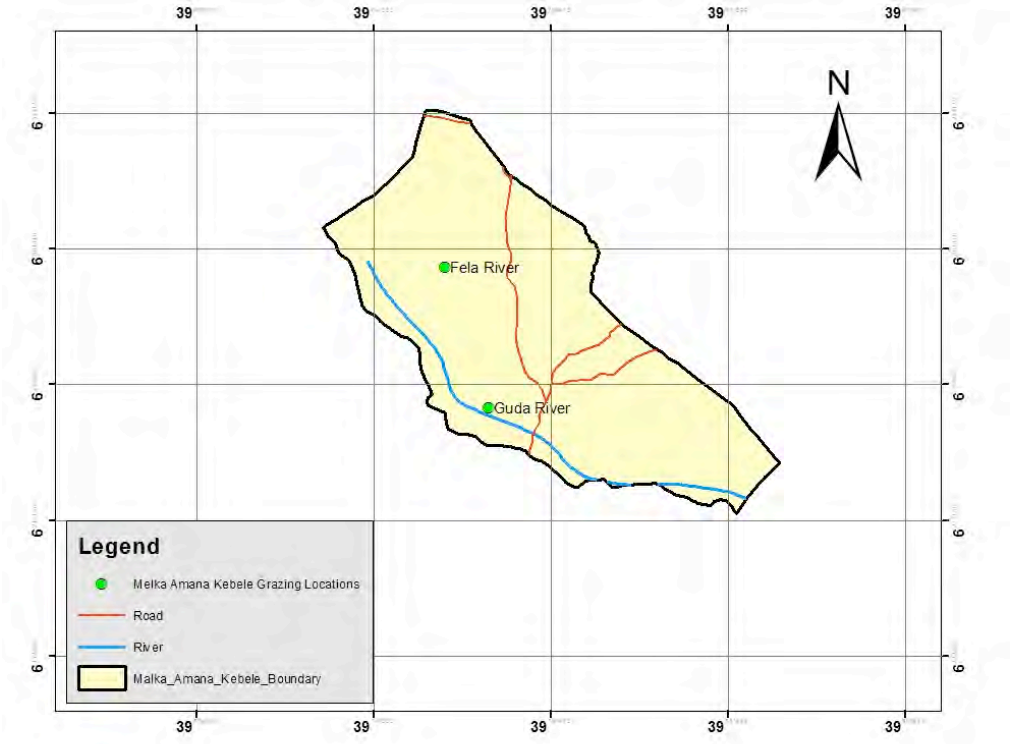
Burkitu PA



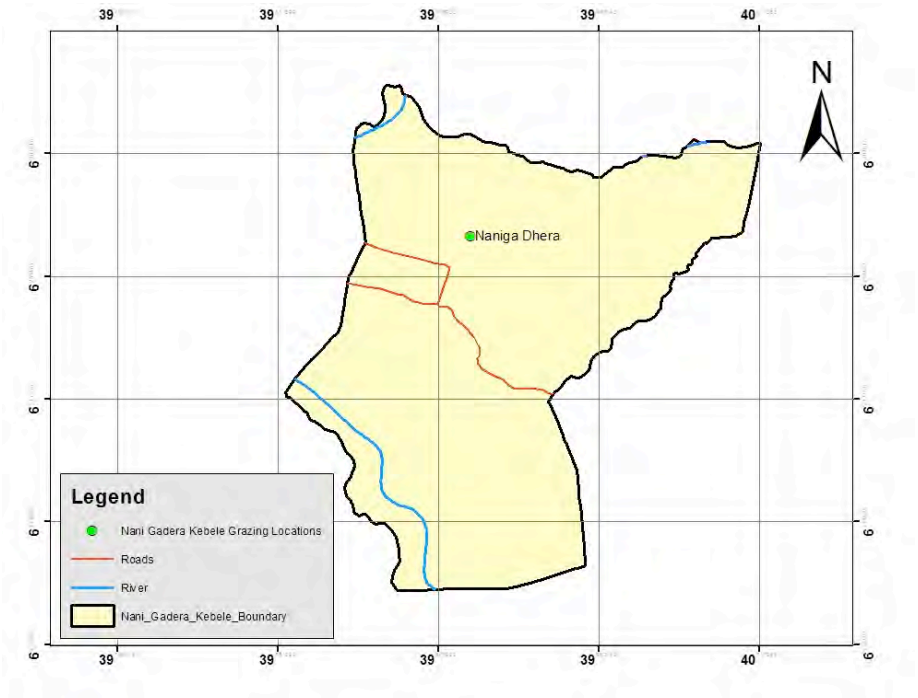
Chiri PA



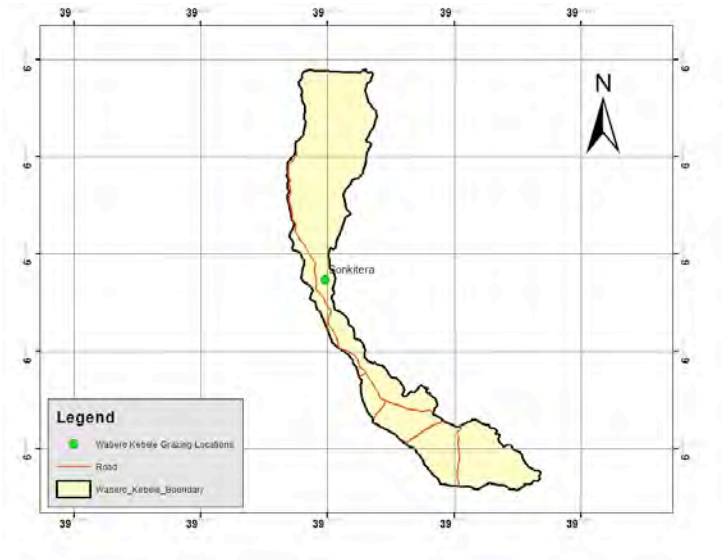
Melka Amana PA



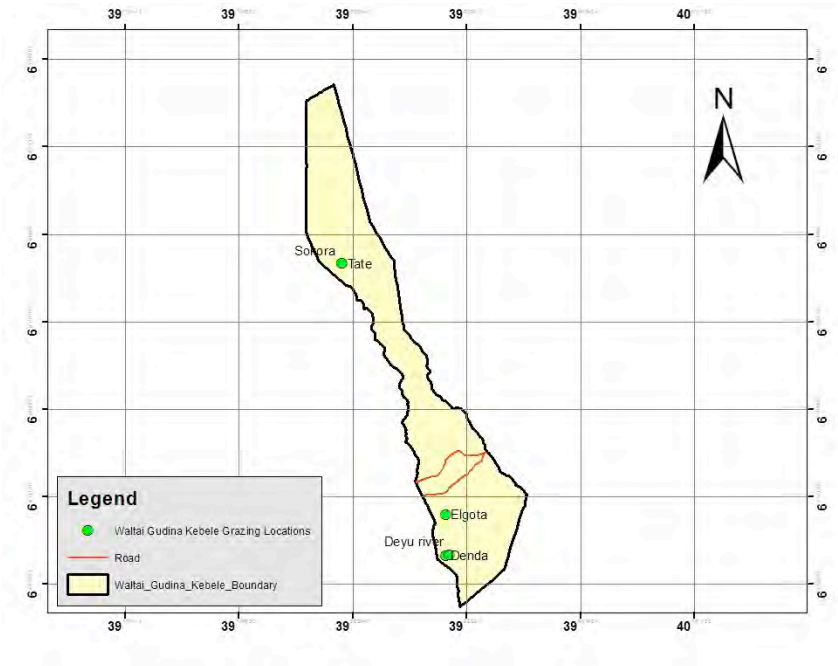
Nani Gadera PA



Wabero PA

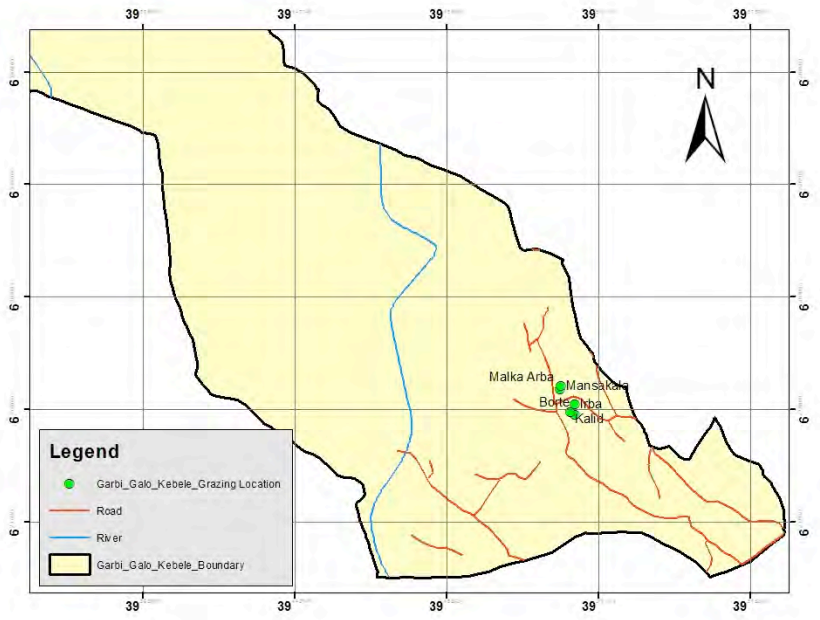


Waitai Gudina PA

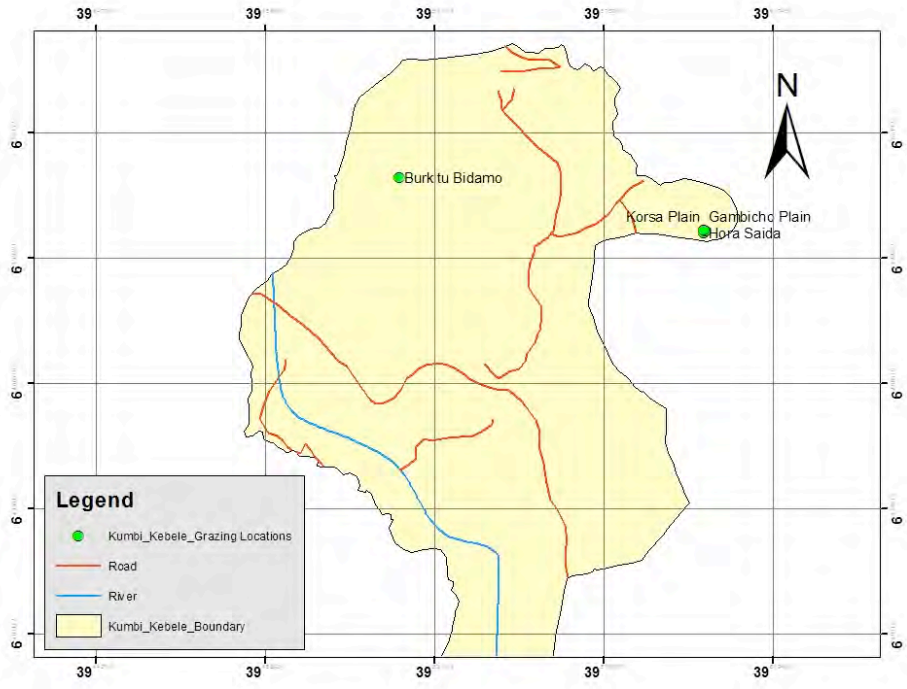


HARENA BULUK WOREDA

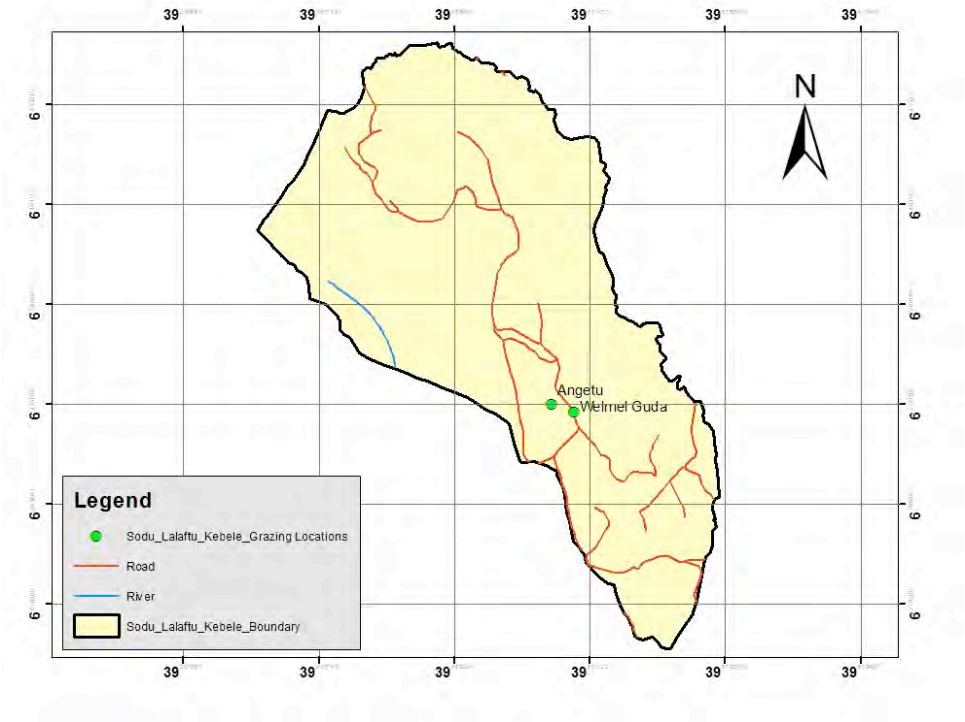
Gerbi Galo PA



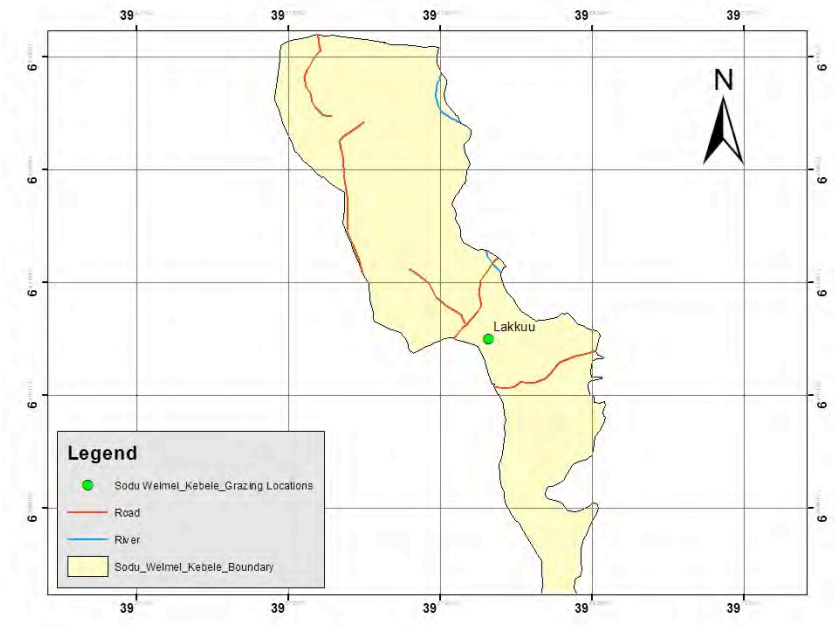
Kumbi PA



Sodu Lalaftu PA



Sodu Welmal PA



APPENDIX 2 – CASE STUDY INDIVIDUAL INTERVIEWS

GOFA_KIM_01

Respondent B has twenty cattle (including three cross-breeds), thirty-one shoats, eight horses, one mule, three donkeys and three hens[62]. Three of his livestock are cross-breed. Three are draught animals, which are used for draught power for about 68 days of the year. He is considered of medium wealth. He is forty years old and educated to 7th Grade. At the time of interview he was living on the Sanetti Plateau.

Proportional piling of types of livestock

In general, he finds grazing is good for his livestock. The best month in the wet season for grazing cattle is *Rajaba/Badhessa* (April) and the best month in the dry season is November. Grazing is scarce between December and March, when there is low rainfall. The best wet season grazing is found in Tullu Korma, Gogoyena and Adoola on the Plateau around his homestead; and the best dry season pastures are found in Chaffa Bal'a and Chaffa Zabi close to the river. In the wet season he directs his cattle out to graze on the Plateau unaccompanied – the livestock know the route to the grazing area and will take themselves back and forth (around one and half hours each way). Other livestock tend to graze or browse around the homestead.

There is no bad pasture area, though cattle do not like the dry season areas because the land is sometimes marshy and hinders their free movement. He uses Hora Qixiixa (qitita) as a mineral source. He uses River Micha for watering of livestock.

Woodland grazing includes *xooshinee (Toshine*), *adaaddoo*, *xuuqqaa* (Tuqa) and *saatoo*. Livestock diseases such as *qufaa* (coughing) and *rajoo* (lung worm) are found in this area – which, it is believed are caused by a type of worm.

Table: Livestock production parameters

Type of livestock	Livestock number per household (range/percentage)	Age when sold (year)		Adult males		Months between births	Prolificacy rate	Milk	
Cattle		Female (adult)	Male (adult)	Number of draught animals	Number of days draught			Duration of lactation (days)	Milking (liters/day)
Local breed	17	4years	5years	3	68	18 months	1	210	2.5
Cross breed	3	6months	6months	-----	-----	12months	1	270	6
Sheep	30	----	-----	-----	-----	5 months	2	-----	-----
Goats	1	---	-----	-----	-----	5 months	2	-----	-----

[62] Confirmed by physical count.

Table: Food purchased and value of animal products

	Feed	Valuation of animal products								
		Home consumption*				Marketed			Not used	
Type of livestock	% of forage purchased	% meat (slaughter)	% milk	%hides and skin	% organic matter	% meat (live animal)	% milk	% organic matter	%hides and skin	% organic matter
Cattle										
Local breed	--	--	--		--	--	--	--	--	--
Cross breed	--	--	--		--	--	--	--	--	--
Sheep	--	--	--		--	--	--	--	--	--
Goats	--	--	--		--	--	--	--	--	--

*Ato Jemal Guto do not purchase any forage

**Ato Jemal Guto used animal products for home consumption; the amount of animal product he marketed is insignificant (as he told to the study team); thus, this Table is blank.

Table: Forage feed cost and farm gate prices of livestock products and live animals

Type of livestock	Farm gate price (in Birr)			Feed cost	Price of products (in Birr)			
	Heifer(sub-adult)	Adult female	Adult male	Forage cost(kg)*	Milk (L)	Hides & skin (piece)	Organic matter(kg)	Draught (rent/day)
Cattle								
Local breed	2500	6000	7000	--	--	---	--	--
Cross breed	3200	20000	---	--	--	----	--	--
Sheep	800	1200	1300	--	--	**40**	--	--
Goats	600	800	1000	--	--	---	--	--

*Do not purchase forage

Proportional piling of types of livestock and indicators

	Adequate grazing close to home	Adequate water close to home	Does not need extra fodder	Needs little care	Can be used for pulling plough
Cattle	000000 (6)	00000(5)	000000(6)	00000(5)	0000000000 0000000000 (20)
Sheep	000000 0 (7)	00000(5)	00(2)	0000(4)	0(1)
Goat	000000 0 (7)	00000(5)	000000(6)	00000(5)	0(1)
Equine	000000 0 (7)	00000(5)	000000(6)	000000(6)	0(1)

Proportional piling of grazing/fodder species and indicators

	Adequate grazing close to home	Plentiful supply all year round	Not expensive*	Palatable	Has medicinal value
Marga	00000000(8)	00000000(8)	---	000000(6)	0(1)
Xooshinee	00(2)	00(2)	---	0(1)	00000000000000000(17)
Saatoo	0000(4)	00000000(8)	---	000000000000	00(2)
Xuuqqaa	000000(6)	00(2)	---	0(1)	-

***Fodder is not purchased.**

Proportional piling of grazing resources

Characteristics	Goggoyena	Tullu Kormaa	Adoola	Caffaa Bal'aa	Caffaa Zabii
Good Quality	0000000000(10)	00000(5)	00(2)	0(1)	00(2)
Good Quantity	000000000000(12)	0000(4)	00(2)	0(1)	0(1)
Close to home	-	00000000(8)	0000000(7)	000(3)	00(2)
No control over acces	-	-	-	00000000(8)	000000000000(12)
Protected but have permission to graze	0000000(7)	00000(5)	00000000(8)	-	-

He has been told that he can no longer access the grazing areas in the BMNP. He said that the Park Administration had told him that this is in order to avoid disturbance to the endemic Ethiopian Wolf. However Respondent B said that wildlife and the local people have lived with their livestock in this environment for generations.

He tends to only sell aged (more than 4-5 years old) and poorer quality livestock. If his cross-breed cows calve, then these may be sold at 6 months. Cross-breeds tend to have calves every 12 months, local breeds every 18 months (with a prolificacy rate of 1); sheep and goats every 5 months (with a prolificacy rate of 2). Local breeds lactate for around 210 days and produce around 2.5 litres of milk per day; cross-breeds lactate for around 270 days and produce 6 litres of milk per day.

GOFA_KIM_02

Respondent C is 56 years old, educated to 5th grade and is from a household of 10 family members (six male and four female). The household owns ten cattle (including two crossbreed and two draught animals), fourteen sheep and six horses. He is considered to be lower end of medium wealth. He says he sells cattle at three years old and sheep at six months old. The draught animals work for 75 days per year. Sometimes horses are used for draught power. Local breeds provide two litres per day.

Good wet season grazing areas are Hadawe, Angesso, Munjaa, Faasila and the Sanetti Plateau. The same areas are also used for dry season grazing – the Sanetti Plateau in particular is critical. Other grazing sites, considered poor, include Micha (steep slopes) and Togona. When there is a shortage of feed he usually takes his livestock up to the Sanetti Plateau, where they will stay for six months or so.

Sometimes family members take the livestock. He follows the main road from Goba Town up to the Plateau, taking about two hours.

Favoured grass species are *Xooshinee, Xoorsoo, Garamba, and Siddiisa and Saatoo.* Grass is called *marga.* Saato is not so palatable, but has high medicinal value. He does not purchase fodder or concentrates for his livestock.

Some of the grazing areas are said to have a high instance of disease including Trypanosomes and lungworm including Hadawe, Munja and Angesso.

He says he has permission to graze on the Sanetti Plateau but he hears that access to grazing in the National Park is now prevented. Grazing in Aloshe is also prevented due to Oromiya Forest Enterprise designating the grazing areas here as government forestland. The Park Administration has told him that he must keep out of the BMNP in order not to disturb the Ethiopian Wolf.

He takes his livestock to mineral springs twice per year – usually Hora Qitita and Hora Mutirqiso. This helps to keep them healthy. The major livestock diseases are Trypanosomes *(waan qabbanaa),* lungworm *(rajoo)* and black leg *(dubar'aa).* He uses both government and private clinics to treat the livestock. He has begun using genetic improvement technologies such a AI and synchronisation. However, he has not obtained benefits as he expected.

Livestock markets are found in Goba and Robe Towns.

Table: Livesock production parameters

Type of livestock	**Livestock number per household (range/percentage)**	**Age when sold (year)**		**Adult males**		**Months between births**	**Prolificacy rate**	**Milk**	
Cattle		**Female (adult)**	**Male (adult)**	**Number of draught animals**	**Number of days draught**			**Duration of lactation (days)**	**Milking (liters/day)**
Local breed	8	3yeras	3years	2	75	12	1	130	2
Cross breed	2	--	--	----	----	--	--	-----	-----
Sheep	14	6months	6months	----	-----	6	1	------	-----
Goats	--	---	---	----	-----	--	--	-----	-----
Horses	6	---	----	----	------	12	1	------	-----

Table: Food purchased and value of animal products

	Feed	**Valuation of animal products**								
		Home consumption				**Marketed**			**Not used**	
Type of livestock	**% of forage purchased***	**% meat (slaughter)**	**% milk**	**%hides and skin**	**% organic matter**	**% meat (live animal)**	**% milk**	**% organic matter**	**%hides and skin**	**% organic matter**
Cattle	--	--	---	--	--	--	--	--	---	--
Local breed	--	--	**100**	--	--	--	--	--	**100****	--
Cross breed	---	---	----	---	---	---	---	---	---	---
Sheep	---	**2**	---	---	---	---	---	---	---	---
Goats	---	----	----	---	---	---	---	---	---	---

***Do not purchase forage**

**** Hides and skin are 100% marketed**

Table: Forage* feed cost and farm gate prices of livestock products and live animals

Type of livestock	Farm gate price			Feed cost	Price of products (in Birr)			
	Heifer(sub-adult)	Adult female	Adult male	Forage cost(kg)	Milk (L)	Hides & skin (piece)	Organic matter(kg)	Draught (rent/day)
Cattle	--	----	----	-----	-----	----	-----	-----
Local breed	--	----	----	-----	-----	-----	-----	-----
Cross breed	---	----	-----	-----	----	----	-----	-----
Sheep	---	----	-----	----	----	**45**	-----	------
Goats	---	----	----	----	----	-----	----	-----

***There is no purchase of forage and any other livestock**

Proportional piling of types of livestock and indicators

	Adequate grazing close to home	Adequate water close to home	Does not need extra fodder*	Needs little care	Can be used for pulling plough
Cattle	0000(4)	000000(6)	--	000000(6)	00000000(8)
Sheep	0000000000(10)	00000000(8)	---	0000(4)	-
Horse	000000(6)	000000(6)	---	0000000000(10)	000000000000(12)

- ****There is no use of extra fodder***

Proportional piling of grazing/fodder species and indicators

	Adequate grazing close to home	Plentiful supply all year round	Not expensive *	Palatable	Has medicinal value **
Marga	000000000000(12)	00(2)	-	0000000000(10)	00(2)
Saato	0(1)	0000000000(10)	-	00(2)	000000000000(12)
Xooshinee	0(1)	0(10	-	00(2)	0000(4)
Siddiisa	0(1)	0(1)	-	0000(4)	0(1)
Xoorsoo	000(3)	0000(4)	-	0(1)	00(2)
Gaarambaa	00(2)	00(2)	-	0(1)	0(1)

****Fodder is not purchased.***

******Sato (saato)****- makes the animals strong and helps to prevent livestock diseases*

***Xooshinee(toshine)**- helps to fatten the livestock and to get more milk from the livestock that feed up on it.*

Proportional piling of grazing resources

Characteristics	Hadawwe	Angasso	Sannate
Good Quality	000000 (6)	0000(4)	0000000000(10)
Good Quantity	0000000 (7)	000(3)	0000000000(10)
Close to home	0000000000(10)	000000(6)	0000(10)
No control over access	000000000000(12)	00000(5)	000(3)
Critical dry season grazing	000000(6)	0000(4)	0000000000(10)
Protected but have permission to graze	-	-	00000000000000000000(20)

GOFA_KIM_03

Respondent D is 75 years old, was educated to 3rd Grade and has two wives, with children. He has four local breed cattle (two of which are oxen), ten sheep, 1 donkey and 6 horses. Draught animals are used for 66 days of the year. Cows are sold at four years old, and sheep are sold at 6 months old. He receives 2 litres of milk per day from local cows – all of which is consumed at home. Manure is used for fields or as fuel. A local heifer costs 4000 Birr, an adult female 5000 Birr, a female adult sheep costs 700 Birr. Milk can be sold for 20 Birr per litre, and sheep hide for 25 Birr. Draught power can be rented for 33 Birr.

Good wet season grazing is found at Hadawe, Munjaa and the Sanetti Plateau. These are also used in the dry season. It takes about one and half hours to get the Sanetti Plateau, and 30 minutes to get to Hadawe. Both he and family members take the livestock to grazing areas. Favoured grasses are *xooshenee* (toshine), *xorosoo* (toroso), *garambaa* and *saato.* There are other pastures near the Togona and Micha Rivers, but these are not so good for livestock. The Togona River is forested so there is less feed available there, while around Micha River

Mineral sources are Hora Qixiixxaa (Qitita) and Hora Muxirqisoo (Muturqiso). Water is plentiful in the wet season, and accessible from the Togona and Micha Rivers in the dry season, around 30 minutes away.

The most common diseases for livestock are Trypanosomosis, lungworm and blackleg. He used private veterinary clinics for treating illnesses. He has never received any support from government livestock extension services. He has never used any genetic improvement technologies.

The main markets are in Goba and Robe towns, and he takes his livestock there along the Dola Mena-Goba Road.

Table: Livestock production parameters

Type of livestock	Livestock number per household (range/percentage)	Age when sold (year)		Adult males		Months between births	Prolificacy rate	Milk	
Cattle		Female (adult)	Male (adult)	Number of draught animals	Number of days draught			Duration of lactation (days)	Milking (liters/day)
Local breed	4	4years	4years	2	66	12	1	210	2
Cross breed	---	---	---	---	----	----	----	----	----
Sheep	10	6months	6months	---	----	6	1	----	----
Goats	---	---	--	---	----	----	----	----	----
Horse	4	2	2	---	-----	---	-----	---	---

Table: Food purchased and value of animal products

	Feed	Valuation of animal products								
		Home consumption				Marketed			Not used	
Type of livestock	% of forage purchased	% meat (slaughter)	% milk	%hides and skin	% organic matter	% meat (live animal)	% milk	% organic matter	%hides and skin	% organic matter
Cattle										
Local breed	-----	-----	100	-----	100	-----	-----	----	----	----
Cross breed	------	-----	-----	------	----	------	------	-----	-----	-----
Sheep	-------	0.5	-----	-------	100	100	------	------	------	------
Goats	-------	-----	-----	-------	----	------	------	-------	-------	-------

Table: Forage feed cost and farm gate prices of livestock products and live animals

Type of livestock	Farm gate price			Feed cost	Price of products			
	Heifer(sub-adult)	Adult female	Adult male	Forage cost(kg)	Milk (L)	Hides & skin (piece)	Organic matter(kg)	Draught (rent/day)
Cattle								
Local breed	4000	5000	----	----	20	----	----	33
Cross breed	----	----	----	----	----	-----	----	----
Sheep	600	700	-----	-----	-----	25	-----	----
Goats	----	-----	------	------	-----	-----	------	----

Proportional piling of types of livestock and indicators

	Adequate grazing close to home	Adequate water close to home	Does not need extra fodder	Needs little care	Can be used for pulling plough
Cattle	0000(4)	000000(6)	0000(4)	000000(6)	00000000(8)
Sheep	0000000000 (10)	00000000(8)	000(3)	00(2)	-
Horse	0000(4)	000(3)	00000(5)	0000(4)	0000000000(10)
Donkey	00(2)	000(3)	00000000(8)	00000000(8)	00(2)

Proportional piling of grazing/fodder species and indicators

	Adequate grazing close to home	Plentiful supply all year round	Not expensive*	Palatable	Has medicinal value
Marga	0000000(7)	0000(4)	-	00000000(8)	0(1)
Saato	0000(7)	00000000(8)	-	000000(6)	0000000(7)
Gaarambaa	00000(5)	00(2)	-	0(1)	0(1)
Xooshinee	000(3)	000(3)	-	0000(4)	00000000(8)
Ansha	0(1)	00(2)	-	0(1)	0(1)
Xoorsoo	00(2)	0(1)	-	0(1)	00(2)

***Fodder is not purchased.**

3.3. Proportional piling of grazing resources

Characteristics	Sannate	Hadawwe	Munjaa
Good Quality	000000000000(12)	000(3)	00000(5)
Good Quantity	0000000000(10)	0000(4)	000000(6)
Close to home	0000(4)	000000000000(12)	0000(4)
No control over access	000(3)	00000000(8)	00000(5)
Critical dry season grazing	00000000(8)	0000(4)	00000000(8)
Protected but have permission to graze	0000000000(10)	0000(4)	000000(6)

GOHI_KIM_01

Respondent E is 55 years old, educated to 7th Grade, with one wife and one son. He has six cattle (three local three cross-breed), ten sheep, five goat and six equines. He is considered 'better off' in the community. Three of his livestock are local draught animals that work for around 120 days per year. He gets 2 litres of milk from local cows, and 7 litres from cross-breeds – all milk is for home consumption. Local cattle are sold at 4-5 years, and cross-breeds at 1.5-2 years. Sheep are sold around 6 months – 80% of which are sold, and 20% used for home consumption. A local breed heifer sells for 3000 Birr, and an adult male or female sells for 6000 Birr. A cross-breed heifer sells for 8000 Birr and adult female sells for 14,000, and male 11,000. Sheep sell for 800, goats 600 Birr. A hide sells for 20 Birr.

Good wet season pasture is found in Awash area. In addition he gives his livestock crop residues, collected and dried from his field. Good dry season pasture is found in Bushare area, a common grazing

area used by most of Hilassa *kebele.* It takes him four hours to walk here. There is also some woodland grazing available in these areas too.

In Bushare area and around the River Magida however, livestock commonly catch diseases *qufa* (a disease that causes coughing) and *rajo* (lungworm). Sometimes there is verbal conflict with livestock owners in Berbere *woreda*, when moving his livestock to Bushare. All grazing is open access for village members.

Livestock are watered at the Magida River about fifteen minutes away, and the Tarura (about four hours) and Bushare Springs. Sources of minerals/salt are Hora Ambare and Hora Muturqiso, and Haya Kosso (lick).

He sometimes encounters problems of feed shortage, particularly between December – April. During this time livestock rely on stubble of crops and crop residues, whilst also trying to access grazing at Awash locality. He also feeds such as *fagulo, furushka* and salt bar to his livestock; and crop residues and additional concentrates especially to oxen and milking cows.

Veterinary health services are inadequate. Livestock are infected with such diseases as trypsanomoses, lacrimation and lungworm. He takes his livestock to veterinary clinics such as Misra Clinic but they are poorly stocked. He has not used AI, but has used bull services. Livestock markets are found in Robe, Salqa and Alemgena. Livestock market routes to these have been used for decades without change. He does not sell any livestock products.

Table: Livestock production parameters

Type of livestock	**Livestock number per household (range/percentage)**	**Age when sold (year)**		**Adult males**		**Months between births**	**Prolificacy rate**	**Milk**	
Cattle		**Female (adult)**	**Male (adult)**	**Number of draught animals**	**Number of days draught**			**Duration of lactation (days)**	**Milking (liters/day)**
Local breed	3	4years	5 years	3	120	18	1	180	2
Cross breed	3	1½years	2years	---	---	12	1	---	7
Sheep	10	5 months	7 months	----	----	6	1	----	----
Goats	5	4months	4months	----	----	4	2	----	----
Horse	2	----	----	----	----	2years	1	----	----
Donkey	2	----	----	----	----	2years	1	----	----

Table: Food purchased and value of animal products

	Feed	**Valuation of animal products**								
		Home consumption				**Marketed**			**Not used**	
Type of livestock	**% of forage purchased**	**% meat (slaughter)**	**% milk**		**% organic matter**	**% meat (live animal)**	**% milk**	**% organic matter**	**%hids and skin**	**% organic matter**
Cattle										
Local breed	**---**	---	100		---	---	---	---	---	---
Cross breed	**---**	---	---		---	---	---	---	---	---
Sheep	**---**	20	---		---	80	---	100	---	---
Goats	**---**	---	---		---	---	---	---	---	---

Table: Forage feed cost and farm gate prices of livestock products and live animals

Type of livestock	Farm gate price			Feed cost	Price of products			
	Heifer(sub-adult)	Adult female	Adult male	Forage cost(kg)	Milk (L)	Hides & skin (piece)	Organic matter(kg)	Draught (rent/day)
Cattle								
Local breed	3000	6000	6000	----	----	----	----	----
Cross breed	8000	14000	11000	----	----	----	----	----
Sheep	500	800	800	----	----	20	----	----
Goats	450	600	700	----	----	----	----	----
Horse	750	---	---	---	---	----	---	---

Proportional piling of types of livestock and indicators

	Adequate grazing close to home	Adequate water close to home	Does not need extra fodder	Needs little care	Can be used for pulling plough
Cattle	00(2)	00(2)	0000(4)	0000(4)	00000000000000000000(20)
Sheep	00000(5)	000000 (6)	00(2)	00(2)	
Goat	00000 (5)	000000(6)	00(2)	00(2)	
Horse	0000(4)	0000(4)	000000(6)	000000(6)	
Donkey	0000(4)	00(2)	000000(6)	000000(6)	

Proportional piling of grazing/fodder species and indicators

	Adequate grazing close to home	Plentiful supply all year round	Not expensive*	Palatable	Has medicinal value
Marga (grass)	0000(4)	000(3)		000(3)	00000 (5)
Sinaara (oats)	00000 (5)	00000 (5)		000000(6)	000000(6)
Boqqoolloo (maize stalk)	00000 (5)	0000(4)		000000(6)	00000 (5)
Haftee midhaanii (crop residue)	000000(6)	00000000(8)		00000 (5)	0000(4)

**Fodder is not purchased*

Proportional piling of grazing resources

	Chaffaa Magida(grass around bank of Magida river)	*Naannoo qaarmaa* (crop stubbles)	Awaash (grazing area)	Busharee (grazing area)
Good Quality	0000(4)	00000000(8)	000000(6)	00(2)
Good Quantity	0000(4)	00000000(8)	000000(6)	00(2)
Close to home	00000000(8)	000000(6)	0000(4)	00(2)
No control over acces	-	-	-	-
Protected but have permission to graze	0000(4)	00000000(8)	000000(6)	00(2)

GOHI_KIM_02

Respondent F is 48 years old, educated to 7th Grade, and has seven members in his family. The owns 2 local cattle, 2 horses and 16 chickens and thus is within the poor category.

Preferences of livestock

During the wet season Respondent F grazes his cattle on his own land, enclosed, and his horses are released into grazing areas around his holding and on the banks of the Rivers Magida and Togona. This is commonly known as *chafa* Magida. The grazing is not good here as it exposes the livestock to disease – also in Busere area. He has a problem getting to his *kalo* because the way is getting blocked – currently he is using the road to the *kalo* by the agreement of the people using the land along the way. Other areas visited in the wet season are Ejersa (five minutes) and Edo Arda (Place of Arda). There is also some woodland grazing. During the dry season he grazes his livestock on his landholding consuming stubble of crops and other crop residues, and sometimes visits areas called Kejelcha and Boyida (around 30 minutes away). All the family help with livestock grazing.

He takes the livestock to Hora Muturqiso for minerals. His livestock is watered at a Spring called Ebera both during the wet and dry season – around 15 minutes away. Everyone is expected to keep the Spring clean – and if not, then they are punished by others.

Respondent F also sows maize and oats, in order to use the stems, leaves and seeds for feeding the livestock. The residues collected from the land are used mainly for his horses.

Within three years he has lost six oxen to disease. He took his livestock to the veterinary clinic as soon as they showed signs of disease, but they were not cured. He has not used AI himself but is aware that such services are available in the *kebele.* The closest market is Robe and Chafe Donsa, which are situated in Sinana woreda.

There has been crop cultivation in *kebele*, and as a result he now takes a different longer route to the grazing area taking double the time – now 1 hour. The route to Ebera has been completely blocked now due to crop expansion.

Table: Livestock production parameters

Type of livestock	Livestock number per household (range/percentage)	Age when sold (year)		Adult males		Months between births	Prolificacy rate	Milk	
Cattle		Female (adult)	Male (adult)	Number of draught animals	Number of days draught			Duration of lactation (days)	Milking (liters/day)
Local breed	2	4yeras	4years			12	1	365	2
Cross breed	--	--	--	--	--	--	--	--	--
Sheep	---	---	---	--	--	---	---	---	---
Goats	--	--	--	--	--	--	--	--	--
Horse	2	4	4	--	--	----	---	--	--

Table: Food purchased and value of animal products

	Feed	Valuation of animal products								
		Home consumption				Marketed			Not used	
Type of livestock	**% of forage purchased**	**% meat (slaughter)**	**% milk**	**Hides & skin (piece)**	**% organic matter**	**% meat (live animal)**	**% milk**	**% organic matter**	**%hids and skin**	**% organic matter**
Cattle										
Local breed	----	----	100	----	----	----	----	----	----	----
Cross breed	----	----	----	----	----	----	----	----	----	----
Sheep	----	----	----	----	----	----	----	----	----	----
Goats	---	---	---	---	---	---	---	---	---	---

Table: Forage feed cost and farm gate prices of livestock products and live animals

Type of livestock	**Farm gate price (in Birr)**			**Feed cost**	**Price of products**			
	Heifer(sub-adult)	**Adult female**	**Adult male**	**Forage cost(kg)**	**Milk (L)**	**Hides & skin (piece)**	**Organic matter(kg)**	**Draught (rent/day)**
Cattle								
Local breed	400	----	----	----	----	----	----	----
Cross breed	----	----	----	----	----	----	----	----
Sheep	----	----	----	----	----	----	----	----
Goats	----	----	----	----	----	----	----	----
Horse	---	----	----	----	----	----	----	----

Proportional pilling of types of livestock and indicators (out of twenty stone)

Types of livestock	Adequate grazing close to home	Adequate watering close to home	Does not need extra fodder	Need a little veterinary service	Can be used for pulling/ploughing
cow	00000000(8)	0000000000000(13)	00000(5)	00000000000000000 (16)	-
horse	000000000000(12)	0000000(7)	000000000000000 (15)	0000(4)	00000000000000000000 (20)

Proportional pilling of grazing/fodder species and indicators (out of twenty stone)

Types of fodder spp	Adequate grazing/browser close to home	Plenty /full supply all year round/	Not expensive	palatability	As medicinal quality
Maize	000000(6)	00(2)	0 (1)	00000000000 (11)	00000000 (8)
Grass	0000000(7)	000000000000 (12)	000000(6)	000(3)	000000 (6)
Oat	00(2)	000(3)	0 (1)	0000(4)	0000(4)
Stubbles/straw	00000(5)	000(3)	000000000000 (12)	00(2)	00(2)

Proportional pilling of grazing resource (out of twenty stone)

Characteristics	Grazing area			
	Ejerso	Arda	Hambaqa	Safara
Good quality	000(3)	00000000(8)	00000(5)	0000(4)
Good quantity	00(2)	000000000000(12)	000(3)	000(3)
Close to home	000(3)	000(3)	00(2)	000000000000(12)
No control over access	0000(4)	000000000000(12)	000(3)	0 (1)
Protected but have permission	--	--	--	--
Critical dry season grazing	0000(4)	0 (1)	000(3)	000000000000(12)

GOAS_KIM_01

Respondent K, aged 75 years male with education status 3rd grade, with 8 family members. He owns 8 cattle; no sheep; no goat; 1 horse; no mule; no donkey

Respondent K takes his livestock to good wet season pasture mainly grazing areas around and on the river bank of Togona and feed on crop residue and straw/stalk that remain after harvest. His good dry season pasture areas include places in and around state farm, grazing areas around and on the river bank of Togona and stubbles of crops in farmland after harvest time is over. There are no any wet and dry seasons pasture that are not good for grazing for Respondent K's livestock in the area. There is no unsuitable grazing area and no woodland grazing area.

Areas where there is incidence of animal diseases in the area are grazing areas around and on the riverbank of Togona and places in and around state farm. The livestock diseases in these grazing areas usually occur in the month of May in particular. There are no grazing areas where access is prevented for his livestcok. Currently there is not any access to mineral water sources (both *hora and haya*); the area that was *haya* has been overtaken by crop cultivation activities. The major water source for watering his livestock is Togona River.

There is no area of conflict with regard to grazing. But there is an area that is demarcated for park "which is called Meles Park" and found around and on the bank of Togona River, which is not allowed for grazing: this is a very recent phenomenon.

Respondent K goes to the same places as mentioned in the FGD. He faces livestock feed shortage both in wet and dry seasons of the year including wet season months of March, April, May, June and July; and also in the dry seasons of the months of September, October, November, and December. He does not feed his livestock by cutting grass or other plants. However, he and his family members sometimes collect fodder to feed their livestock. He also feeds his livestock with additional concentrates of feeds such as *furushka* and *fagulo* which he obtains through purchase. He feeds his livestock with fodder and additional concentrates from the months of May up to August and in the local wet season and from September up to December in the dry season of the area.

With regard to veterinary and animal health services he sends his livestock to veterinary clinics situated in Robe town and Shallo locality when they become sick. He sometimes purchases the medicine himself and provides it to his livestock when he observes sign of sickness. He has not used any livestock technological improvement such as AI and synchronization yet; but he usually uses bull services.

The main marketing route is towards Robe town, a route that is becoming narrower and narrower due to expansion of crop cultivation across the route. He sells only live animals when he needs the money

for his personal and family affairs; when they become old and when some of the female animals become infertile/unproductive due to reasons he does not know.

Table: Livestock production parameters

Type of livestock	Livestock number per household (range/percentage)	Age when sold (year)		Adult males		Months between births	Prolificacy rate	Milk	
Cattle		Female (adult)	Male (adult)	Number of draught animals	Number of days draught			Duration of lactation (days)	Milking (liters/day)
Local breed	4	3years	3years	2	120	18months	1	180	1
Cross breed	4	3years	3years	2	80	--	1	---	---
Sheep	---	----	----	----	----	----	----	----	----
Goats	--	----	----	----	----	----	----	----	----
Horse	1	-----	-----	-----	-----	-----	-----	-----	-----

Table: Food purchased and value of animal products

	Feed	Valuation of animal products								
		Home consumption				Marketed			Not used	
Type of livestock	% of forage purchased	% meat (slaughter)	% milk		% organic matter	% meat (live animal)	% milk	% organic matter	%hids and skin	% organic matter
Cattle										
Local breed	----	5	100		----	50	----	----	----	100
Cross breed	---	---	---		---	---	---	---	---	---
Sheep	----	----	---		----	----	----	----	----	----
Goats	----	---	---		----	----	----	----	----	----

Table: Forage feed cost and farm gate prices of livestock products and live animals

Type of livestock	Farm gate price			Feed cost	Price of products			
	Heifer(sub-adult)	Adult female	Adult male	Forage cost(kg)	Milk (L)	Hides & skin (piece)	Organic matter(kg)	Draught (rent/day)
Cattle								
Local breed	2500	7000	8000	-----	-----	-----	-----	-----
Cross breed	7000	12000	13000	-----	-----	-----	-----	-----
Sheep	----	----	----	-----	-----	-----	-----	-----
Goats	----	----	----	-----	-----	-----	-----	-----

Proportional piling of types of livestock and indicators

Type of Livestcok	Adequate grazing close to home	Adequate water close to home	Does not need extra fodder	Needs little care	Can be used for pulling plough
Cattle	000000000000000 (15)	0000000000 (10)	000000(6)	00000(5)	0000000000 (10)
Horse	00000(5)	0000000000 (10)	000000000000000 (14)	000000000000000 (15)	0000000000 (10)

Proportional piling of grazing/fodder species and indicators

Feed Type	Adequate grazing close to home	Plentiful supply all year round	Not expensive	Palatable	Has medicinal value
Marga (Grass)	000000 (6)	00000(5)	00000(5)	0000000000000 (13)	000000000000000 (15)
Haftee midhaanii (Crop Residue)	00000000000000 (14)	000000000000000 (15)	00000000000000 (15)	0000000 (7)	00000(5)

Proportional piling of grazing resources

Characteristics of grazjng resources	**Togona (around and on the banks of Togona river)**	***Qonna mootummaa* (in and around state farm-after harvest time)**
Good Quality	0000(4)	0000000000000000 (16)
Good Quantity	0000(4)	0000000000000000 (16)
Close to home	0000000000000000 (16)	0000(4)
No control over acces	-	-
Protected but have permission to graze	-	-

GOAS_KIM_02

Respondent L is 57 years, educated to 4th grade, and has 8 family members. He has 9 cattle; 17 sheep; no goats; 2 horses; no mule; and 4 donkeys.

Good wet season pasture is found on the bank of Magida River, while his good dry season grazing is a place called Sheydaba. Alternative wet season pasture is in and around the state farm. He has no access to any woodland grazing pasture for his livestock. There is an incidence of livestock diseases in grazing areas in and around state farm. This farm is situated in areas adjacent to Ashuta kebele. There are no grazing areas where access to livestock is prevented in the kebele. The area where the *haya* is found has also been overwhelmed by expansion of crop cultivation; and currently it is not functional. There is no *hora.* The main water sources for watering livestock are Togona and Magida Rivers both of which flow in and adjacent to Ashuta kebele.

There is no area of conflict with regard to grazing. But there is an area that is demarcated for park "which is called Meles Park" and found around and on the bank of Togona River, which is not allowed for grazing. This is a very recent phenomenon.

Respondent L considers himself to be a sedentary farmer who does not practice migration with his livestock. In fact there is no alternative for grazing of livestock at different times, due to the way of life (settled farming) and scarcity of adequate grazinglands in the kebele.

Shortage of feed for livestock occurs in both the wet and dry seasons of the year. Feed shortage usually occurs in the months of March, April, May, June and July. During the remaining months of the year the problem of feed shortage is not acute, since the livestock mainly feed up on crop residues and crop stubbles and stalks of crops which remaind in the field after harvest time. He also cuts grass and accumulates it and feed his livestock in time of shortage of feed. In additional he provides his livestock with maize and oats seeds to augment livestock feed supply. Straw and hay are collected both by him and his family members and mainly feed his livestock with these fodders in the months of January and Feruary in particular. After the fodders are cut, he said we coolect, tie them with rope, and acuumulate in a separate storage that is meant for fodder accumulation. After mixing the fodders with *fagulo* he feeds his livestock. He also feeds his livestock with additional concentrates of feed such as *fagulo* and *furushka*.

Due to diseases such as blackleg and internal parasites his animals sometimes become sick. He takes his livestock for treatment to Misra veterinary clinic, which is located in Hilasa kebele. He sometimes purchases the medicine himself and provides it to his livestock when he observes certain sign of sickness

up on his animals. He does not use livestock production improvement technologies such as AI and synchronization. But he uses bull services.

The main market route is to Robe town. He takes his livestock to market when they become old, when it becomes unproductive/ unable to give birth to a calf, and at times when he needs money for his own purposes or his family affairs. No other livestock products and byproducts are sold. There is no much change with regard to livestock route. However, the existing market route is becoming narrower due to expansion of crop cultivation across the route.

Table: Livestock production parameters

Type of livestock	Livestock number per household (range/percentage)	Age when sold (year)		Adult males		Months between births	Prolificacy rate	Milk	
Cattle		Female (adult)	Male (adult)	Number of draught animals	Number of days draught			Duration of lactation (days)	Milking (liters/day)
Local breed	9	5years	4years	4	105	19months	1	180	2
Cross breed	----	---	---	---	---	---	---	---	--
Sheep	18	---	---	---	---	---	2	---	---
Goats	---	---	---	---	---	---	---	---	---
Horse	2	---	---	---	---	---	----	---	---

Table: Food purchased and value of animal products

	Feed	Valuation of animal products								
		Home consumption				Marketed			Not used	
Type of livestock	% of forage purchased	% meat (slaughter)	% milk	%hids and skin	% organic matter	% meat (live animal)	% milk	% organic matter	%hids and skin	% organic matter
Cattle										
Local breed	---	---	100	---	100	----	---	---	---	---
Cross breed	----	---	----	----	----	---	----	----	----	----
Sheep	----	20	----	----	----	80	----	----	----	----
Goats	----	---	----	----	----	---	----	----	----	----

Table: Forage feed cost and farm gate prices of livestock products and live animals

Type of livestock	Farm gate price			Feed cost	Price of products			
	Heifer(sub-adult)	Adult female	Adult male	Forage cost(kg)	Milk (L)	Hides & skin (piece)	Organic matter(kg)	Draught (rent/day)
Cattle								
Local breed	-----	-----	-----	1800	-----	-----	-----	-----
Cross breed	-----	-----	-----	----	-----	-----	-----	-----
Sheep	----	----	----	----	----	----	----	----
Goats	----	----	----	-----	----	----	----	----
Horse	----	----	----	---	----	-----	-----	----

Proportional piling of types of livestock and indicators

Type of livestock	Adequate grazing close to home	Adequate water close to home	Does not need extra fodder	Needs little care	Can be used for pulling plough
Cattle	00000(5)	000000 (6)	00000000(8)	000000(6)	000000000000000(15)
Sheep	000000000000(12)	00000000 (8)	0000000000(10)	0000(4)	-
Equine	000(3)	000000(6)	00(2)	0000000000(10)	00000(5)

Proportional piling of grazing/fodder species and indicators

Type of feed	Adequate grazing close to home	Plentiful supply all year round	Not expensive	Palatable	Has medicinal value
Marga (grass)	00000(5)	0000(4)		00000000(8)	000000(6)
Haftee midhaanii (crop residues)	00000(5)	0000000000(10)		00(2)	00(2)
Boqqoolloo (maize)	00000(5)	0000(4)		000000(6)	0000(4)
Sinaara (oats)	00000(5)	00(2)		0000(4)	00000000(8)

Proportional piling of grazing resources

Characteristics of grazjng resources	***Qaarmaa naannoo gandaa* (stubbles and stalks in farmland after harvest)**	***Qonna mootummaa* (in and around state farm-after harvest time)**
Good Quality	000000000000(12)	00000000(8)
Good Quantity	000000(6)	00000000000000(14)
Close to home	000000000000000(15)	00000(5)
No control over acces	-----	------
Protected but have permission to graze	----	-----
Critacal dry season grazing	00000000(8)	000000000000(12)

GOAS_KIM_03

Respondent M is 45 years old, educated to 3rd grade, with 10 family members. His wife is aged 42, educated to 3rd grade. He has one cow and one ox, but no other livestock. They are in the destitute category.

Good wet season pastures are Edo and Sheydadba areas, with less good grazing on the banks of the Magida River as there is a plant that affects livestock health. Relatively good dry season grazing are areas around and in the government seed farm enterprise and on the banks of Magida River. There is no access to woodlands.

The grazing area around Magida River is protected, since it had been given to small enterprises by the government. Mineral sources are not available in the area. Before ten years there was mineral source around Magida river (which is called *haya* Magida), but currently it has been overwhelmed by crop cultivation. During both wet and dry seasons the main source of water for livestock watering are Togona and Magida rivers.

With only two cattle, there is no need to move to find feed and water for his animals. All members of his family participate in herding and watering of their cattle, especially his children have more involvement. Grazing land which is found in areas where small scale enterprise occupies the land is protected and requires permission and payment to use for livestock grazing in it.

The major water sources for watering his livestock are Magida and Togona rivers. Children are mainly involved in watering of of the livestock. The time taken to reach both of these rivers is one hour each. There is no any control, conflict, permission and payment for watering livestock. Herbs which are used for livestock are also found around government seed farm enterprise and around Sheydaba area.

They face shortages of livestock feed in the months of April, May, September and October. Feed availability for his livestock happens in the months of December, January, February and March. The major feeds for his livestock include crop residues (mainly wheat and barely straws), oats, maize, and natural grass among others. Household head and the children usually collect crop residues for the livestock. It takes about one week to collect crop residues. He collects the fodders and stores in a storing house which is meant for the accumulation of the crop residues. In this way the fodder is protected from being spoiled specially by rain and can be easily managed. He takes out the fodder from the store and

feeds his livestock with it. *Frushka* is a supplementary feed for his livestock. He purchases one quintal of *frushka* per month. The price of on quintal of *frushka* is Birr 450 at the time of the study.

He told the study team livestock diseases like mangemites, anthrax and blackleg affected his animals and his ox was sick last year and could not recover. As a result he lost his ox. He usually uses traditional way of treating his animals when they become sick. He has never used government veterinary clinics. He used AI service only once but unfortunately his cow did conceive. He is willing to use improved livestock production technologies, but it has become unaffordable for him.

The main market areas are Robe town and Chafe Donsa area, and there is no any change of market routes. He sells his livestock when he faces financial problems. Most of the animal products such as milk and butter are consumed in the household.

Table: Livestock production parameters

Type of livestock	**Livestock number per household (range/percentage)**	**Age when sold (year)**		**Adult males**		**Months between births**	**Prolificacy rate**	**Milk**	
Cattle		**Female (adult)**	**Male (adult)**	**Number of draught animals**	**Number of days draught**			**Duration of lactation (days)**	**Milking (liters/day)**
Local breed	2	2	2	1	100	1.8	1	300	1.5
Cross breed	---	---	---	---	---	---	---	---	---
Sheep	----	----	----	----	----	----	----	----	----
Goats	---	---	---	---	---	---	---	---	---

Table: Food purchased and value of animal products

	Feed	**Valuation of animal products**								
		Home consumption				**Marketed**			**Not used**	
Type of livestock	**% of forage purchased**	**% meat (slaughter)**	**% milk**	**%hides and skin**	**% organic matter**	**% meat (live animal)**	**% milk**	**% organic matter**	**%hides and skin**	**% organic matter**
Cattle										
Local breed	50	3	100	---	---	---	---	---	---	---
Cross breed	---	---	---	---	---	---	---	---	---	---
Sheep	----	----	----	----	----	----	----	----	----	----
Goats	---	---	---	---	---	---	---	---	---	---

Table: Forage feed cost and farm gate prices of livestock products and live animals

Type of livestock	Farm gate price (in Birr)			Feed cost	Price of products (in Birr)			
	Heifer(sub-adult)	Adult female	Adult male	Forage cost(kg)	Milk (L)	Hides & skin (piece)	Organic matter(kg)	Draught (rent/day)
Cattle								
Local breed	---	8000	7000	450	20	---	---	---
Cross breed	----	-----	------	------	------	----	----	----
Sheep	-----	-----	------	------	------	-----	-----	-----
Goats	---	-----	------	------	------	---	---	---

Table: Proportional pilling of types of livestock and indicators (out of twenty stone)

Type of livestock	Adequate grazing close to home	Adequate watering close to home	Does not need extra fodder	Need a little veterinary service	Can be used for pulling/ploughing
Cattle					
Cow	0000000000(10)	0000000000(10)	0000000000000(13)	000000(6)	--
Ox	0000000000(10)	0000000000(10)	0000000(7)	00000000000000(14)	00000000000000000000(20)

Table: Proportional pilling of grazing/fodder species and indicators (out of twenty stone)

Types of fodder spp	Adequate grazing/browser close to home	Plenty full supply all year round	Not expensive	palatability	As medicinal quality
Grass	00(2)	00(2)	000(3)	0000000000 (10)	0000000000 (10)
Oats(*sinar*)	0(1)	0(1)	--	000(3)	000(3)
Maize	0000(4)	000(3)	0(1)	000(3)	0000(4)
Crop residues	000000000000 (12)	0000000000 000(13)	000000000000 000(15)	00(2)	00(2)
Frushka	0(1)	0(1)	--	00(2)	0(1)

Table: Proportional pilling of grazing resource (out of twenty stone)

Characteristics	Grazing area		
	Togona river bank	Magida rever bank	Arda
Good quality	0000(4)	0000000000 (10)	000000(6)
Good quantity	000000 (6)	0000000000 (10)	0000(4)
Close to home	00000(5)	00000(5)	0000000000 (10)
No control over access	00000(5)	00000(5)	0000000000 (10)
Protected but have permission	0000000(7)	00000000000000(13)	---
Critical dry season grazing	0000000(7)	00000000000000(13)	---

HBSW_KIM_01

Respondent G is 50 years old, educated to Grade 4, with one wife and ten children. His wife is 38 years old, educated to Grade 2. They have 5 cattle (including 2 draught animals), 15 hives and 2 chickens (i.e. poor). Cows produce two litres per day. A local heifer is produced by Birr 2000, an adult female will sell for Birr 4000, an ox for Birr 7000.

Preferred livestock

Types of livestock	Adequate grazing close to home	Adequate watering close to home	Does not need extra fodder	Need a little veterinary service	Can be used for pulling/ploughing
Cow	●●	●●●●	●●●● ●●	●●●	0
Ox	●●●●●● ●●●●●● ●●●●●●	●●●●●● ●●●●●● ●●●●	●●●●●● ●●●●●● ●●	●●●●●● ●●●●●● ●●●●●	●●●●●●● ●●●●●●● ●●●●●●

Wet season grazing is at Werba, Dagona, Lakkuu and Waamichana. Dry season grazing is at Dagona, Callicho, Alemgana and Guurii. Browsing is found in the forests including sites Arabee, Mata gomaa, and Gagamaa. Browse is also found in the lowlands – in Aaraa, Hirqee and Dhigrii.

The livestock moves to the Forest in the dry season. After two months the livestock moves out of the Forest and stays around the homestead for at least three weeks. During this period the livestock is fed with crop residues, leaves and sweet potatoes, leaves of sugar cane and those who can afford it will feed sugar cane to their livestock until they are moved to the lowlands.

Preferred fodder types

Types of fodder spp	Adequate grazing/browser close to home	Plenty full supply all year round	Not expensive	palatability	As medicinal quality
Grass	●●●	●		●●●●	●●●● ●●
Browse	●	●●●● ●●		●	●
Maize leaves	●●●●	●●		●●●● ●	●●●
Teff straw	●●●●	●		●●●	●●
Sweet potato	●●●● ●●	●●		●●●	●●●● ●

Preferred grazing sources

	Grazing area			
	Warabbaa	Dagonaa	Melka arba	Callichoo
Good quality	●●	●●●●	●●●● ●●	●●●● ●●●●
Good quantity	●	●	●●●● ●●	●●●●●● ●●●●●●
Close to home	●●●● ●	●●●● ●●●●●	●●●	●●●●
No control over access	●●●● ●●●	●●●●	●●●	●●● ●●●
Protected but have permission				
Critical dry season grazing	●●●	●●●● ●●	●	●●●●● ●●●●●

Sodu Welmal is surrounded by rivers that flow from the Forest. Water is available throughout the year in both the dry and wet season grazing areas.

Mineral licks are found at Melka Arba *kebele* including: Haya Urdee, Haya Gurraachaa, Haya Diimaa, and Haya Bitaachaa; and in Sodu *kebele* including Haya Jigichaa and Haya Bishan Adii (though access has been denied due to crop cultivation in the area). Mineral springs also exist in Sodu Welmal including Hora Busooftuu, Hora Habiree, Hora Werseessaa (Shawee) and Hora Dhoqqee.

Lions have been known to attack the livestock in the Forest during the dry season – family members move with the livestock and watch them.

Livestock are sold in Angetu, Melka Arba and Delo Mena markets. Delo Mena is 8 hours away, but the price is more than what is received at Angetu and Melka Arba close to the village. Respondent G has seen that the settlers bring in improved livestock and intensively manage livestock, but he has not heard about any extension services or provision of improved breeds from the government.

HBMA_KIM_01

Respondent H is 66 years old, he has no education. He has ten children and one wife (?). He owns 14 cattle (two of which are oxen that work fifty days draught per year), 5 goats, and 1 donkey. He has 2 ha of land for growing crops including teff, haricot bean and sesame. Lactating cows give about 1 litre of milk per day used for home consumption. Local breed heifers sell for 2000 Birr, an adult female for 4000 Birr, and an ox for 6000 male. Goats sell for 600-800 Birr.

Preferred livestock types (out of 20 x stones)

Types of livestock	Adequate grazing close to home	Adequate watering close to home	Does not need extra fodder	Need a little veterinary service	Can be used for pulling/ploughing
Cow	5	7	3	3	0
Ox	7	6	5	5	20
Goat	3	4	6	5	0
Donkey	2	3	6	7	0

During the dry season he moves his livestock to a placed called Camari near Hora Guratii in the Harena Forest. He also visits Hara Dhoqee (mineral springs) every two weeks. He will stay in the Forest for two months with his livestock. He also manages wild coffee during his stay. He also practices beekeeping but the government stops them using fire when collecting the honey.

Once the wet season starts he takes his animals to Melka Amana where get also accesses mineral licks. He has marriage ties to this area so is given favour to graze there.

When his livestock get sick he buys drugs and treats them himself. If the livestock are badly ill then he will take them to Angetu or Melk Amana veterinary clinics. The service provided in the clinics is not satisfactory.

Preferred fodder and feed types (out of 20 x stones)

Types of fodder	Adequate grazing/browser close to home	Plenty full supply all year round	Not expensive	palatability	As medicinal quality
Grass	9	10		10	14
Crop residue	4	3		3	2
Straw	2	2		2	1
Fodder	5	5		5	3

Preferred grazing resources (out of 20 x stones)

Characteristics	Grazing area		
	Berak	Forest	Melka Arba
Good quality	10	6	4
Good quantity	12	5	3
Close to home	4	6	10
No control over access	12	6	2
Protected but have permission	-	-	-
Critical dry season grazing	2	12	5

HBMA_KIM_02

Respondent J is 48 years old, educated to 6th grade, has two wives and ten children (five of whom go to school in Melka Arba). He has 3 ha of farmland. He is considered to fall in the 'rich' category. One of his wives, aged 35, resides in Melka Arba town with six children, and who often visits the second wife who resides in the principal grazing area called Kuchu which takes about half a day on foot. The second wife is 28 years old with four children resides in the wet season grazing area, Kuchu, where the livestock stay for around 2 months whilst there is water in surface ponds. There is a mineral lick here too.

Although he is considered to be 'rich' he reported that he has only ten cattle, thirty goats and two donkeys. Both of his houses are well built with several rooms and tin roof.

Preferred types of livestock

Types of livestock	Adequate grazing close to home	Adequate watering close to home	Does not need extra fodder	Need a little veterinary service	Can be used for pulling/ploughing
Cattle	●●●●	●●●●	●●●●	●●●●	●●●●●●●● ●●●●●●●● ●●●●
Goat	●●●● ●●●●	●●●● ●●●●	●●●●● ●●●●●	●●●● ●●	
Donkey	●●●● ●●●●	●●●● ●●●●	●●●● ●●	●●●●● ●●●●●	

Finding grazing and browse has become more difficult in recent years, so he sold his camels and instead bought two motorbikes, which he uses to provide transport services. He said that if had had the choice he would have preferred to keeps his livestock but he was forced to do so because the grazing area has been taken over by crop cultivation. He himself has three hectares of farmland.

The dry season grazing area is found in Chalicho (Callicho) and he takes his livestock there for around three months. Ten years ago he went to Chalicho through Angetu, with the livestock spending at least 45 days on the outskirsts of the forest especially around Hora Tako (Xaaqoo). However, due to agricultural encroachment in this area he has had to change the route, and as a result it takes double the time (2 days) to get there.

The buffer zone between the dry and wet season grazing areas has been taken by the resettled farmers from Hararghe. This zone/area is now completely under chat/quat and other crop cultivation. It is difficult to stop in this area at all with livestock and this puts and added burden on weak animals and calves. Coffee plantations are fenced further preventing livestock movement. He said: "The grazing space we see this year; we do not see next year…. Changes from farm encroachment is becoming faster these days."

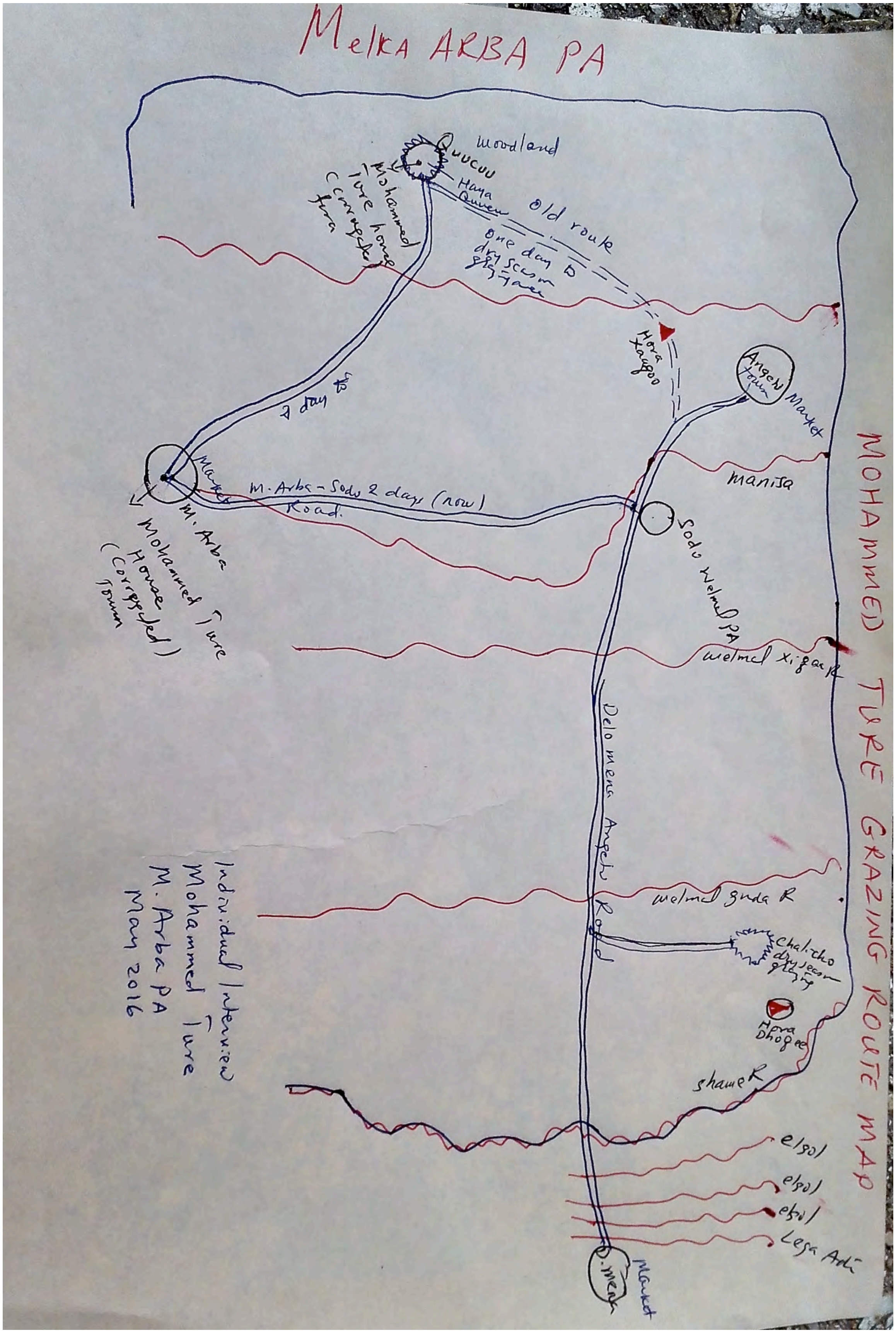
Hora Dhoke (Dhoqee) is near his grazing site of Chalicho. He takes his livestock to Hora Dhoqee every week if the livestock graze very well. He told us that if livestock gets good feed, they can be taken to mineral springs every week but if the feed is less, livestock are taken every 15 days or even a longer interval. Taking to cattle to the h*ora*/mineral spring is related to good feeding. He can also access the Welmal River, which is near the grazing site.

Preferred fodder types

Types of fodder	Adequate grazing/browser close to home	Plenty full supply all year round	Not expensive	palatability	As medicinal quality
Grass	●●●●● ●●●●● ●●●●●	●●●●● ●●●●● ●	●●●●● ●●●●●	●●●●● ●●●●● ●●●●●	●●●●● ●●●●● ●●●●●
Dhgiri	●●●	●●●●●	●●●●● ●	●●●	●●●
Haroressa	●●	●●●●	●●●●	●●	●●

Preferred grazing areas

	Qunatity	Quality	No Challenge
Challico/Callicho	●●●●●	●●●●●	●●●●●
Quucuu	●●●●● ●●●●● ●●●●●	●●●●● ●●●●● ●●●●●	●●●●● ●●●●● ●●●●●

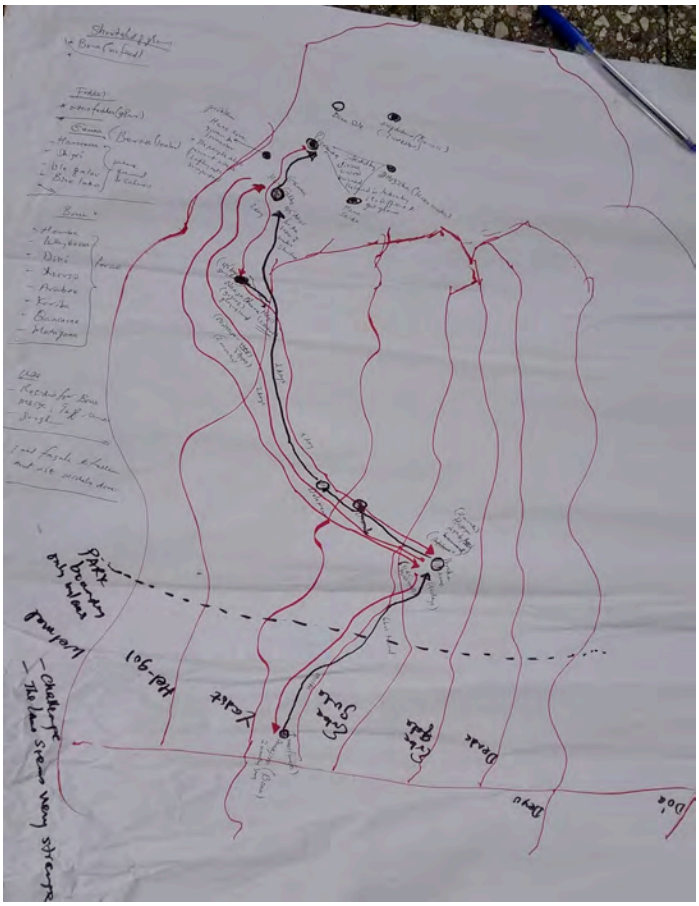

Melka ARBA PA
MOHAMMED TURE GRAZING ROUTE MAP
woodland
Old route
M. Arba - Sodu 2 days (now)
Road.
M. Arba
Mohammed Ture
Market
manisa
Sodu Welmel PA
welmel guda R
Hora Dhogee
shame R
elgol
elgol
elgol
Lega Adi
Market
Individual Interview
Mohammed Ture
M. Arba PA
May 2016

DMER_KIM_01

Respondent A (DMER_KIM_01) is categorised as rich by the community. Educated to 6th Grade, he has two wives (one aged 32 and one aged 20 years old) and five children who live in the same compound. He owns 20 cattle, 20 goats and 2 donkeys. All livestock are local breeds. Cattle are sold between ages of 6-8, and shoats between 3-4 years. Four of the cattle are draught animals – used for about 30 days of the year. Lactating cows produce about 1 litre per day.

He collects 30+ quintals of wild coffee per year, and produces 50+ quintals of barley from five hectares of land. He is very active and involved in livestock rearing, cultivation of coffee and crops. He is an active members of the community.

During the wet season Respondent A takes his livestock to Hara Golba in Berak and stays there for one and half months since the surface water there cannot sustain his livestock longer than this. He then proceeds to Qeremsa for another month despite it being invaded by thorny bushes (*jirime*). No longer can he take his livestock to Hara Saida and Dhugicha since the land has been given to investors. After two and a half months he starts moving back to Erba stopping in Nanega Dheera *kebele,* Gogowe grazing area for two to three weeks on the way. Then he proceeds directly to the dry season grazing area of Awajiro and stays there for around two months. During this time his livestock are watered at the Mulka River. The grazing and water is good at this site. Crop residues are used to supplement feeding as required, and weak or lactating animals kept near the household are often fed cut grasses and leaves.



Respondent A highlighted that he used to have large numbers of livestock before there were all these changes in (losses of) the grazing land. He is dissatisfied with crop cultivation as this requires a lot of labour, is susceptible to unpredictable weather changes, and requires skills that he and the larger community do not have. He is trying to adapt to the new situation, but sees himself getting poorer and poorer over time.