

## Research site selection for SI-FMS initiative at Basona Worena woreda

Initiative: Sustainable Intensification- Mixed Farming system - Ethiopia

Date: 30 – 31 August 2022

Place: Debre Birhan/Basona Worena

Implementers: Alliance of Bioversity International and CIAT (ABC); International Livestock Research Institute (ILRI) and International Center for Agricultural Research in the Dry Areas ICARDA

Partners: Basona Worena office of Agriculture and Debre Birhan University, Debre Birhan Agricultural Research Center (DBARC).

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Figure 1. Discussion with Basona Worena Woreda oreda Agricultural office on the joint research site selection

### Activity: Research site selection for SI-FMS initiative at Basona Worena woreda

Ethiopia is among the five implementors of this initiative and the implementing team composed of individuals from various CG centres based in Addis Ababa, Ethiopia has made visited to the agreed project sites in Ethiopia on 30 August 2022. In north Shewa, it was agreed that Basona Worena will be the implementing site of this initiative activities. On this day, SI – MFS initiative implementing team composed of researchers from Alliance of Bioversity International and CIAT, ICARD and ILRI has travelled to Debre Birhan area to select research site for integrated research efforts and technology aggregations. The objective of the site selection was to implement research interventions and improve the land, crop, and livestock productivity through sustainable intensification of the mixed farming system (SI-FMS) initiative. The team has discussed with Basona Worena Woreda of Agriculture and livestock offices to identify the specific project implementation kebele. After the purpose of the initiative was discussed site selection criteria was set to select the implementation kebele. The woreda people have proposed three kebeles and each kebele was evaluated for the following criteria and rated (Table 1 and 2).

Table 1. Descriptive evaluation of candidate kebeles for NRM activities, crop and livestock resource and development potential

Kebele	NRM	Crop	Livestock
Debele	<ul style="list-style-type: none"> <li>• The kebele has 4 sub-watersheds</li> <li>• Has project support on physical structure construction</li> <li>• Experience of tree lucerne production on watershed and soil bunds</li> <li>• Watershed use cooperative established</li> <li>• Upper, mid and foot slope land scape</li> <li>• No irrigation accesses</li> <li>• Sever water shortage</li> <li>• Raining season May -September</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>• Barley dominated kebele</li> <li>• Less wheat and pulse production</li> <li>• Potato produced widely and has good potential, but farmers used delayed harvesting storage techniques</li> </ul>	<ul style="list-style-type: none"> <li>• Better dairy production mainly by of local breads</li> <li>• Better in sheep production potential</li> <li>• Better forage oat production potential and experience</li> <li>• There is start on cattle fattening after plough</li> <li>• Tree lucerne production by integration watershed</li> <li>• Barley rop residue is main feeds source</li> <li>•</li> </ul>
Abamote	<ul style="list-style-type: none"> <li>• This kebele has 2 sub -watersheds with Terraces and bunds. It lacks biological integrations.</li> <li>• Better in forage development and protection of the watershed</li> <li>• Experience in cultivation of forage and tree lucerne <ul style="list-style-type: none"> <li>✓ Limited knowledge on use of tree lucerne as feed source</li> </ul> </li> <li>• Good landscape for NRM interventions</li> <li>• 400 ha irrigated land</li> <li>• Dega and weyina dega agroecology</li> <li>• Rain season June to September</li> </ul>	<ul style="list-style-type: none"> <li>• Wheat, barley, faba bean, lentil, field pea and linseed are the major crops in their order</li> <li>• Mos crop varieties are local due less research intervention .</li> <li>• Suitable soil types for crop production.</li> </ul>	<ul style="list-style-type: none"> <li>• High dairy production potential</li> <li>• availability of cross breeds with AI service and milk producer cooperative</li> <li>• Has dega and weyina dega agroecology</li> <li>• Good cattle fattening experience</li> <li>• High sheep production potential (Menz breed)</li> <li>• Forage production (Oat-vetch and , oat) during summer &amp; Belg seasons as well as under irrigation</li> </ul>
Chiraro Debir	<ul style="list-style-type: none"> <li>• Has 2 sub-watersheds</li> <li>• SWC structures (terraces, trenches)</li> <li>• Good community commitment</li> <li>• Farmers grow tree lucerne and Phalaris</li> <li>• Has 122 ha of irrigated land</li> <li>• Weyina dega dominant agroecology</li> </ul>	<ul style="list-style-type: none"> <li>• Wheat, faba bean, teff, chickpea are dominant crops. Barley is not commonly grown.</li> <li>• Vegetables, wheat and faba bean are produced with irrigation</li> <li>• Most varieties are local</li> </ul>	<ul style="list-style-type: none"> <li>• Small ruminant and cattle fattening</li> <li>• Poor dairy production and less cross breeds</li> <li>• Cut and carry system, crop residue, cultivated forage are feed sources</li> </ul>

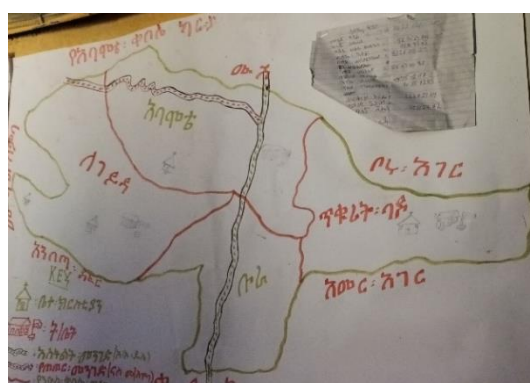
Following listing the potential of each kebele for NRM, crop and livestock production, about 12 selection criteria were identified to rank the kebeles. Each kebele rated out of 3 points for each criterion where score 1 = poor; 2 = good and 3 = very good. Then the score over the 12 criteria were summed up and kebele that got the highest score sum was agreed to be selected. As indicated in table 2, Abamote kebele was selected with 31 score of 36 maximum points and will be the joint research kebele in Bosana Worena. The following table shows the kebele selection criterions and scores.

Table 2. Kebele selection criteria and scores

No	Selection criteria	Selection criterions score		
		Abamote	Debele	Chiraro Debir
1	Diversified crop production	3	1	3
2	Kebele and sub-kebeles accessibility	3	2	1
3	Good land scape for NRM interventions	3	3	1
4	Irrigation access and potentials	3	1	3
5	Dairy potential	2	2	1
6	Small ruminant fattening potential	1	2	3
7	Large ruminant fattening potential	2	1	2
8	Strong watershed development initiative	2	3	3
9	Community interest and willingness to participate	3	2	2
10	Government support and extension services	3	2	3
11	Feed and forage production experiences and potential	3	1	2
12	Existence of community-based institutions	3	2	1
	Total scores	31	22	25
	Kebele rank	1	3	2

### Description of Abamote Kebele

This Kebele has been located on the main road from Debre Birhan to Dessie at the distance of 25km from Debre Birhan and composed of four sub-Kebeles: Abamote, Legayida, Bura and Tikurit Bado with area coverage of 3126.28 hectares (ha). The Kebele border with Gudo Beret Kebele from North; Keyite from South, Ankober Woreda from east, and Mehal Amba Kebele from West directions. With local classification system, about 10% of the Kebele lay above 3000 meters above sea level (masl) and categorized as *Wurich* – means very cold areas. However, the majority of its land mass lay between 2300 – 3000 masl and classified as *Dega* – means highland. The remaining 20% is located at elevation of 1500 – 2300 masl and is *Weyina Dega*- means mid-highland.



Administrative map of Abamote Kebele

### The climatic condition of this Kebele

According to Köppen climate type, the climate of north Shewa zone is subtropical highland climate or temperate oceanic climate with dry winters. The climate of the selected kebele is

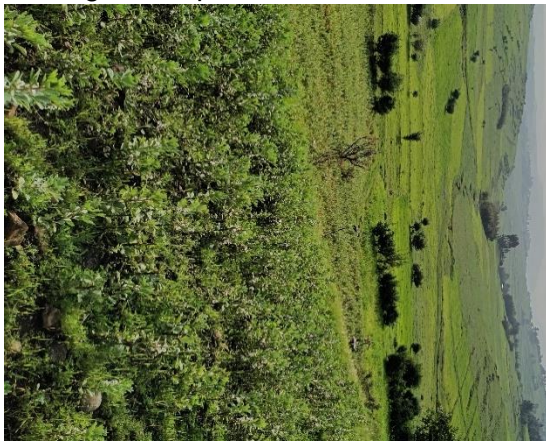


therefore subtropical highland with annual average rainfall of over 1300mm and average temperature of 18<sup>0</sup>c. The average elevation of this kebele is about 2849masl.

*Soil type:* Clay soils are the dominant soil type of the area with rough distribution of 60% brown soil, 25% light black and 15% red soil (*kebele record shows*).

*Land use land cover:* The landform of Abamote Kebele is undulated type divided into various watersheds. According to the note from this Kebele agricultural office, the land is used for various economic purposes including farming, nature conservation and human habitat. Accordingly, about 83% (2595ha) is farmland, 8% (240.8ha) pastureland, 7% (235.2ha) forest land, 1.5% (47.6ha) for house construction and 0.5% (7.8ha) for other purposes.

*Major crops:* highland temperate crops are dominantly grown in Basona Worena in general and Abamote kebele, in particular. Economically grown crops include barley (*Hordeum vulgare*); wheat (*Triticum aestivium*), faba bean (*Vicia faba*) and field pea (*Pisum sativum*). Vegetables are also produced both as rainfed as well as irrigated crops. The major vegetable crops grown in Abamote kebele include beet root , onion, garlic, carrot, potato, tomato, lettuce, cabbage and spinach.



Crop field planted to faba bean, wheat and tree lucerne (*included as biological trench support unit*).

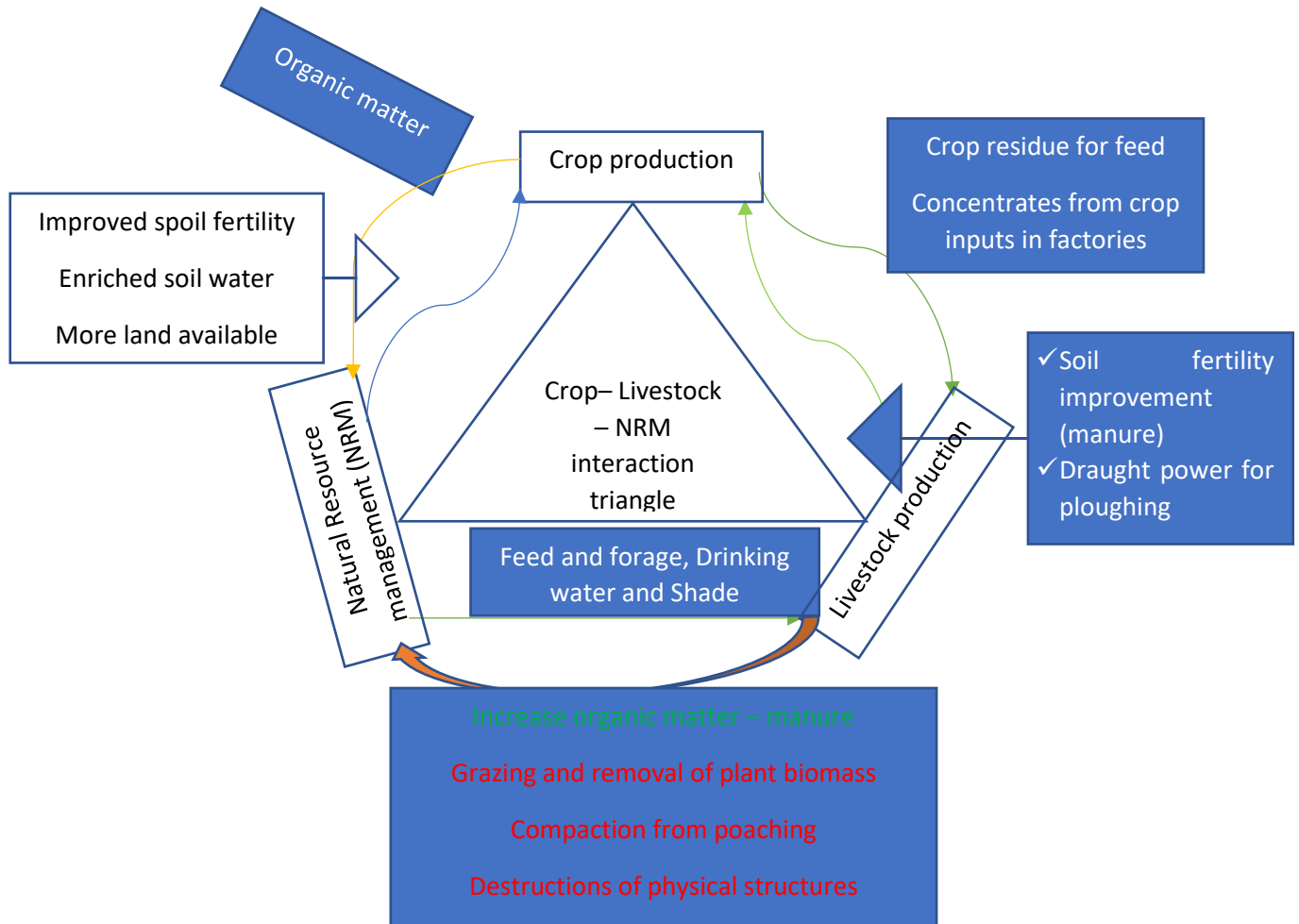
*Livestock:* Cattle, sheep and goat are the main animals produced and contribute to the economy. Dairy farming and fattening of both small and large ruminants are the main contributor to the economy and becoming the major job opportunity for youths and women. According to the data posted in Abamote kebele, the kebele has about 2892 heads of large ruminants (oxen, cow, bull, calf and heifer); 7566 heads of small ruminants (sheep and goats); 4198 poultry animal (chicken) and 3484 equines (horse and donkey). Apiculture is also component of their farming system having 21 modern, 4 transitional and 327 traditional hives.

The farming system of Basona Worena Woreda is highland crop – livestock mixed system where both sectors strongly depend on each other.

1. Cereal based farming system
  - a) Wheat based farming system
  - b) Bean based farming system
  - c) Barley based farming system
  - d) Irrigated farming
2. Cereal – forage cropping system (agroforestry)
3. Livestock farming system
  - a) Dairy farming system (Semi-intensive stage)

- b) Fattening farming system (small and larger ruminants), at its semi-intensive stage
4. Poultry farming... (semi-intensive)
5. Apiculture farming
6. Forestry system (state forest)

Figure 1. Schematic representation of crop – livestock – NRM interactions at Abamote Kebele



Text in red indicate negative interaction.

Major identified crop production constraints

**Narrow genetic basis:** - for all crops including the major cultivated ones like wheat, barley and beans, there are few varieties available for farmers. This narrow genetic basis increases the risk of vulnerability to climate change impacts including diseases and pests attack, drought and frost damage and others. Hence, increasing varietal portfolio of wheat, barley and faba bean as well other the vegetable crops is needed.

**Disease and pests:** - major crop diseases such as rust, smut, faba bean gall, chocolate spot, wilt and late blight were identified. Also, some insects are known to affect crop performance in this kebele, and the common insects include aphids, barley shoot fly, rodents (e.g. rat) and cut worm. Because its high rainfall, weed is also the major crop production constraint in this kebele.

**Irrigation potential:** - There are couple of stream water sources available for irrigation practices. So far, more than 400 ha of land is under irrigation. The potential could be more than this as the landform seems suitable for irrigation. Carrot, beet root, garlic,

onion, head cabbage, lettuce, potato, tomato, faba bean and forage such as Oat and Oat vetch mixture are produced under irrigation.

#### Identified livestock production constraints

- Feed shortage, which was identified as a primary constraint, was attributed to poor feed resource utilization, low forage production, and limited forage species diversification. Soaring of industrial and commercial feed resources due to shortage of ingredients supply, poor market orientation of feed production, increment of transport cost
- Poor performance of local non improved sheep and dairy breed performance
- Traditional livestock production and fattening system
- Poor market linkage for milk producer
- Inadequate veterinary infrastructure and services

**NRM interventions:** - the Kebele has 5 sub watersheds, out of these Gura, Jilobado and tikurit bado are the three watershed that the kebele agricultural office has been actively implementing different soil and water conservation physical and biological structures. At Tikurit Bado and Jilo bado NRM interventions started before 10 years, and at Jilo bado in 2021. At the two old sub watershed's physical structure construction will be continued at the bottom side and maintenance at the whole sub watersheds. In all the watershed soil bund, stone bund, cut off drain physical structures and biological structures like tree Lucerne and Phalaris grass are integrated. All the interventions are done with community mobilization every year from January to march. The support from NGOs was very little at this site, only seedlings from the Woreda nursery site. The reduction in soil erosion because of the NRM interventions and the forage value of tree Lucerne and Phalaris grass shows the better community interest to participate in NRM works. Stone bund is also commonly implemented at farm level.

In the three watershed, free grazing, shortage of planting materials and lack of technical support are still challenges for the NRM interventions.

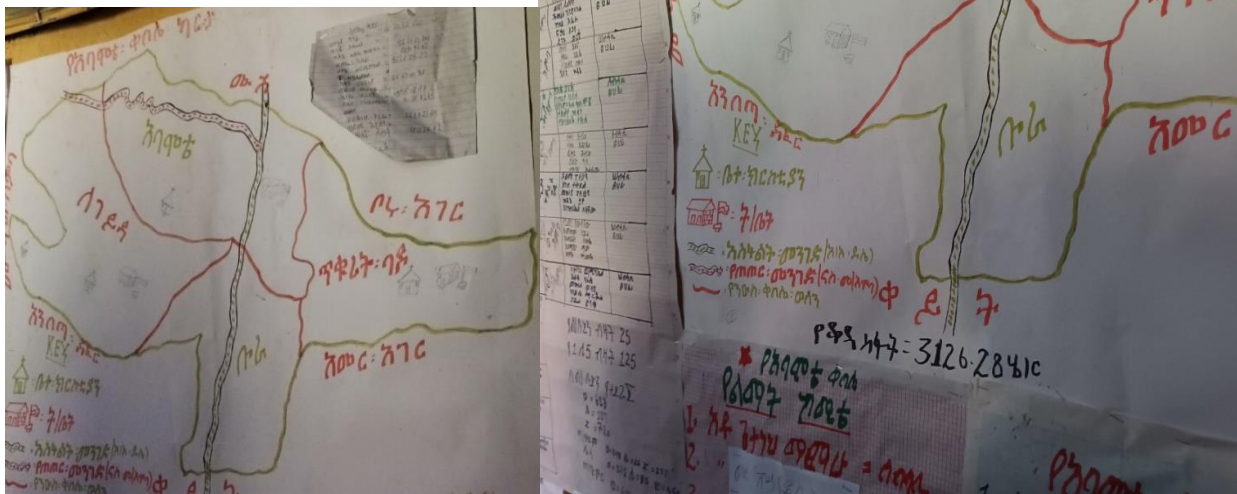
#### Contact level at district level

1. Negese Woldemariam.....Agriculture office head (0913790078)
2. Afwork Abera .....Livestock Resource Development office head (0921037451)

#### Contacts at kebele level

1. Aynaddis Nega..... Kebele office of agriculture head (mobile: 0904653404)
2. Alem Girma ..... veterinarian (Tel: 0978741392)
3. Almaz Mengistu..... crop production expert (Mobile: 0904653903)
4. Molla Endalemaw .... Irrigation expert (Tel: 0915717411)
5. Mistre Woldemariam .... Animal production expert (Mobile: 0921919382)
6. Melkamu Dagne ..... NRM expert (Mobile: 0935483548)

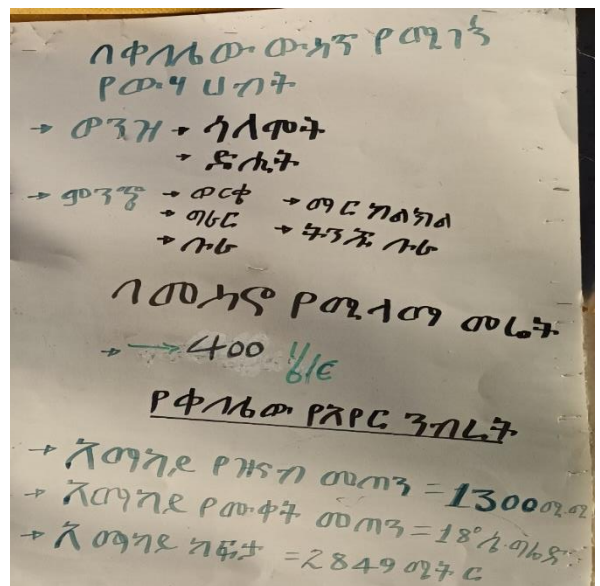
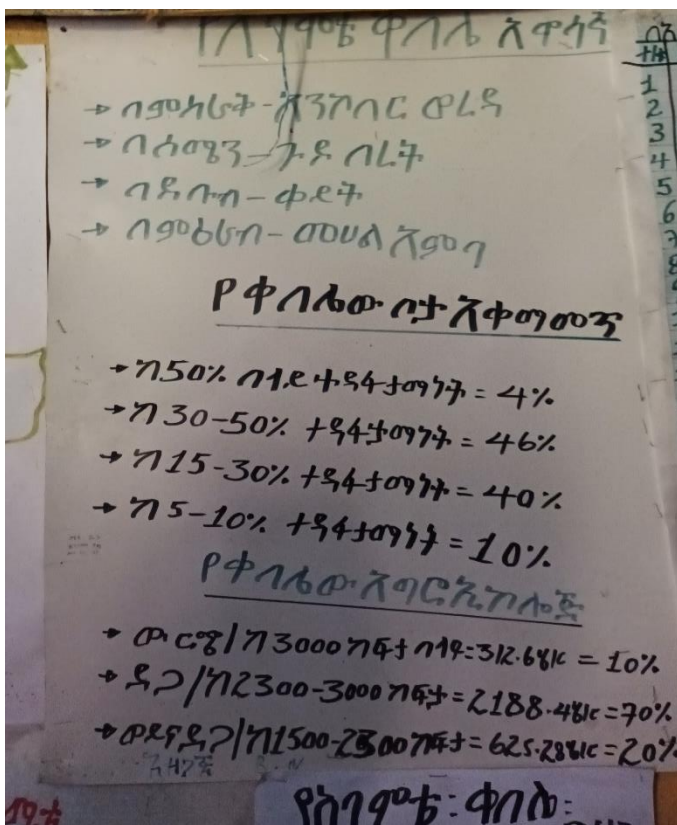
Annex 1 map of the kebele (in



Amharic)

Aba Mote kebele is bounded by Mush in the north, Boru Hager in northeast, Hamer Hager in east, Keyit in the south and Anbeta defar in the west.

Landscape and Agroecology of Aba Mote Kebele



Water resources in Aba Mote Kebele



6000 ገብተኛ ገብተኛ

3000 ገብተኛ ገብተኛ = 312.6% = 10%

00-3000 ገብተኛ = 2188.4% = 70%

11500-23000 ገብተኛ = 625.28% = 20%

የሰጠው ቁጥር፡ ቀጠሎ፡  
ህዝብ፡ ብዛት

ወ = 2076  
ሴ = 2001  
ጾ = 4077

የቀጠሎ የመሬት ስጦታ ቀጠሎ

- በአርጎ የተሰጠው የገብተኛ = 2595% = 83%
- የግጥም መሬት = 240.8% = 7%
- የደን መሬት = 235.2% = 8%
- መንገድ = 47.6% = 1.5%
- ሌሎች = 7.8% = 0.5%

በቀጠሎ ውስጥ የሚመረቱ የደን ግጥም ስጦታ

- 1- ገብተኛ
- 2- ገብተኛ
- 3- ገብተኛ
- 4- ሌሎች

መሰጠት  
በግጥም ውስጥ  
ሰጠው

በቀጠሎ ውስጥ የሚመረቱ የሌሎች ስጦታ

- በግጥም ስጦታ = 60%
- ቀጠሎ ስጦታ = 25%
- ቀጠሎ ስጦታ = 15%

Aba Mote kebele population (male 2076; female 2001; total = 4077)

Aba mote Kebele Land use and major crops

የሰጠው	የሰጠው	የሰጠው	የሰጠው
1	2	3	4
5	6	7	8
9	10	11	12
13	14	15	16
17	18	19	20
21	22	23	24
25	26	27	28
29	30	31	32
33	34	35	36
37	38	39	40
41	42	43	44
45	46	47	48
49	50	51	52
53	54	55	56
57	58	59	60
61	62	63	64
65	66	67	68
69	70	71	72
73	74	75	76
77	78	79	80
81	82	83	84
85	86	87	88
89	90	91	92
93	94	95	96
97	98	99	100



Representation of peace situation of villages in the kebele; green flag indicates the village was free of any crime or peace violations. Innovate way of ensuring peace and security

Major animals and their diseases