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Participatory Disease Surveillance in Dawe Sarar and Dawe Kechen Districts of East Bale Zone, Oromia Regional State

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Abstract

Diseases of small ruminants are one of the common problems that hinder production. One is Peste des petits ruminants (PPR), or small ruminant plague, is a viral disease primarily affecting goats and sheep. The objectives of the study were to prioritize the major diseases of sheep and goat in selected districts of Oromia Regional State based on producers' perception in participatory manner and to understand the status of PPR through PDS technique to enlighten further epidemiological study and future control endeavor. Two districts were selected from the zone (Dawesere and Dawekachen) and the selection of the PAs (the lowest administrative level in Ethiopia) in each district was determined in discussion with the district livestock offices. Participatory epidemiology techniques like Semi structured interviewing, Ranking and scoring, participatory mapping, proportional pilling and semi-structured interview and seasonal disease calendars were utilized. The major livestock species raised in Dawesere are cattle, Sheep, goats, Camels, donkeys, Bee and poultry and whereas, in Dawekechen are cattle, Sheep, goats, Camel, donkeys, Bee and poultry. The main constraints in livestock production discussed in respective districts were as follows: Drought, Diseases of animals, Shortage of grazing land (feed) and Water, Market problem, poor coverage of animal health service were the problems listed by informants that hindering their livestock productions. A disease like Albatii (PPR/Diarrhea), Marto (Coenurus cerebral), leydaa/Qndhoo (general symptom), Qawessa (Anthrax/wanadu), Saalaa, chittoo/Mange mites/ External parasites, Botote/Botorsa (Skin disease/Sheep and goats pox), Abdera/Deraba (orf), and Saallessa (gatachiisaa/ Brucellosis), somba/ \ccpp, Onkkobo/okkolchiisa/ maasa/ FMD, Shilmii/ Tick infestation, were discussed as a major problem of small ruminants production the Districts.

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Keywords

Peste Des Petits Ruminants, Dawesere, Dawekechan, Asella, Small Ruminants.

Introduction

Livestock play a major role in the livelihoods of over 70% of the population. Small ruminants provide with a vast range of products and services, including milk, meat, skins, and wool throughout the year. They are cheaper to buy compared to larger animals, they reproduce rapidly and are easily sold for cash or

exchanged for other staples. Diseases of small ruminants are one of the common problems that hinder production. One is Peste des petits ruminants (PPR), or small ruminant plague, is a viral disease primarily affecting goats and sheep. A Peste des petits ruminant (PPR) is a highly contagious viral disease that mainly affects sheep and goats. Heavy losses can be seen, especially in goats, with morbidity and mortality rates sometimes

approaching 80-100%. And a disease of major economic importance. PPR was selected as the next target for global eradication party because of its severe economic and social impact but also because eradication is considered within a short time frame of less than 15 years in total, using lessons learnt from RP eradication. Although there are significant difference in epidemiology between PPR and RP the condition favored the eradication of RP are also largely present for PPR.

Therefore the objectives of the study were to prioritize the major diseases of sheep and goat in selected districts of oromia Regional state based on producer's perception in participatory manner and to understand the status of PPR through PDS technique to enlighten further epidemiological study and future control endeavor.

The objectives of the participatory disease search (PDS) for pneumo-enteritis syndrome and PPR:

- To map livestock resources and movements,
- To assess the presence of pneumo-enteritis syndrome and PPR, and the history of these diseases in the area, using local knowledge of disease.
- Defining PPR epidemiological areas and linkages to other areas, in order to have a focused PPR control intervention.

Study and target areas

Write here about selection area means 3.1 headline

Selection of the study districts and PAs

The selection of the study districts was carried out in discussion with ARVL, Zonal and Districts Livestock Development and Resource teams with the knowledge of high sheep and goats population, where high movements of the animals within and between the districts, fear of high risk area in pneumo-enteritis syndrome the districts and of course some consideration was given for representativeness of the districts in their geographical location for the other parts of the zone and districts. Two districts were selected from the East Bale zone (Daweserer and Dawekechen) and the selection of the PAs (the lowest administrative level in Ethiopia) in each district was determined in discussion with the district livestock offices. Three PAs per the study District were selected purposively based on the risk of pneumo-enteritis syndrome and a total of six PAs were selected for study. The selection of elite community key-

informants and informants were purposive which was essential to collect in depth information on a number of issues.

Description of Study Area

East Bale zone

East Bale zone is one of the Oromia National Regional states. The Zone capital town is Gindhir is located at 563km from Addis Ababa. It has 7 Districts. From 7 districts 2 (two) of them namely Daweserer and Dawekechen were selected for PDS.

East Bale Zone is found in the south east part of the Oromia National Regional State. The zone astronomically lies between 7°8'N 40°42'E. It shares borderlines with Arsi, Bale, West/Hararghe, Somali region and East Hararghe zones. It has 7 administrative districts including one especial district. Gindhir is the capital town of the zone. It is located at 563 km from Addis Ababa. The Zone has the longest borderline with Somali region. It has the second longest line with Bale Zone. Having the total area of 28,571 Km², it accounts for about %16.22 percent of the total area of the Regional State of Oromia. Climate is divided into three agro-climatical zones mainly due to variation in altitude. It is dominantly characterized by desert (about 79.2% percent) followed by Midland (about 12.5% percent) and Highland 8.3%. The category of warm temperature is found in the low land areas of Raitu, Daweserer, Dawekechen, sawena, and Legehida districts.

According to the 2022 animal population data of the Zonal Livestock Development show that East bale zone holds about 968,502 cattle, 346,288 sheep, 1,169,458 goats, 10,304 horses, 20,449 mules, 130,169 donkeys, and 212,281 camels.

The commonly known livestock market found in the zone is Gindhir (oda town) livestock markets. The animal movement routes in the zone are from to oda town and Web River.

Dawesarar District

Dawesarar District is located at the south eastern of the zonal capital and 750 km away from Addis Ababa, at an altitude 640 masl and at 06.110767° N and 41.679067° E. Daweserer is one of the districts in the Oromia Region of Ethiopia. Part of the East bale Zone, Daweserer is bordered on the south by Gorbakeksa of somale region,

on the west by Raitu, on the north by Ime of Somali region, and on the southeast by Chirati of Somali region. The administrative center of the woreda is Bared. Mount Basira, ware, Cabis and Marero are the highest point in this woreda. A survey of the land in this woreda shows that 45% is field planted with pasture, and 55% is considered swampy, mountainous or otherwise unusable.

The 2007 national census reported a total population for this woreda of 53,293 of whom 28145 were men and 25147 were women. Dawe serer has 18 PAs and administrative center of the woreda is Bared. The altitude of this woreda ranges from 529 to 640 meters above sea level.

Based on 2022 district Livestock Development and resource, the livestock population of the district comprises that about 54403 cattle, 126755 sheep, 349245 goats, 18212 donkeys, 49685 camels and 66555 poultry.

DaweKechen District

Dawekechen is one of the woredas in the Oromia Region of Ethiopia. Part of the East Bale Zone it is located in the south part of the zone. It is one of the East Bale zone districts and located 636KM from Addis Ababa on the direction of South east and 79 KM from Gindhir, the capital town of the zone in the direction of south. The administrative center for the woreda is Mi'o; other towns include Sofumer.

Dawekechen is bordered on the south by Guradamole on the west by Goro on the east by Somali region, on the North by Raitu. The altitude of this woreda ranges from 700-1600 meters above sea level. The 2007 national census reported a total population for this woreda of 71432, of whom 35556 were men and 35786 were women. It has on average annual temperature, 31-38°C. In addition it has Annual rain fall on average 500-700mm. A survey of the land in this woreda shows that 100% is kola and considered swampy, mountainous or otherwise unusable. Based on 2022 the livestock population of the woreda comprises about 139181 cattle, 65216 sheep, 204890 goats, 9952 Donkeys, 443 Mules, 42145 Camel and 24264 poultry. The main livestock markets center found in districts are Mi'o town. Animal Movement routes from this districts and are neighboring districts web river and oda livestock markets.

Date of PDS

The PDS was carried out from 01/11/ 2022- 06/11/ 2022.

Personnel in PDS team

Implementation

A PDS team from Asella Regional Veterinary Laboratory was deployed to field and collected, reviewed of secondary data and participatory disease search at the zone. Participatory epidemiology techniques like Semi structured interviewing, Ranking and scoring, participatory mapping, proportional pilling and semi-structured interview and seasonal disease calendars were utilized. Accordingly three PAs each which are Bared, Hantura and Hantutu from Daweserer and Dibekilofta, Ardaoyru and Mantokeharawaticha from Dawekechen districts were visited for PDS respectively. About 13 to 32 key informants were the interviewed groups and participants.

Results and Discussion

Main livestock species kept

The major livestock species raised in Daweserer are cattle, Sheep, goats, Camels, donkeys, Bee and poultry. The relative numbers were simply ranked (fig.7) by the key informants for each targeted districts and kebeles. In each PAs they ranked animal species based on their perception of abundance and their economic value for their livelihood. Although slight variation exists in the perception of the informants across the PAs, they ranked the highest population size as goats, sheep, cattle, Camels, donkeys, poultry (chicken) and Bee. However, the priority ranking on the economic value from the highest to the least was goats, sheep, cattle, Camels, donkey, poultry (chicken), and bee in descending order. Accordingly, the following table summarizes are ranking as per district visited and overall ranked (Table 3 & 4), seen as below.

The major livestock species raised in Dawekechen are cattle, Sheep, goats, Camel, donkeys, Bee and poultry. The relative numbers were simply ranked by the key informants for each targeted districts and kebeles. In each kebele they ranked animal species based on their perception of abundance and their economic value for their livelihood. Although slight variation exists in the perception of the informants across the PAs, they ranked the highest population size as goats, sheep, cattle, donkeys, poultry (chicken), camel, and Bee. However, the priority ranking on the economic value from the highest to the least was goats, sheep, cattle, camel poultry (chicken), donkeys, and Bee in descending order.

Accordingly, the following table summarizes are ranking as per district visited and overall ranked (Table 5 & 6), seen as below.

In summarizing major livestock species raised and their economic importance in PDS districts of Eas Bale zone were ranked for each targeted districts. According to the ranks the highest population size as goats, sheep, cattle, and camel, donkeys, poultry (chicken), and Bee.

However, the priority ranking on the economic value from the highest to the least was, goats, sheep, cattle, camel, poultry (chicken), donkey, Bee in descending order and overall zonally ranked (Table 7 & 8), seen as below.

Major livestock production constraints

The main constraints in livestock production discussed in respective districts were as follows: Drought, Diseases of animals, Shortage of grazing land (feed) and Water, Market problem, poor coverage of animal health service were the problems listed by informants that hindering their livestock productions.

Major Diseases of Small Ruminants

Of which main small ruminant constraints listed by key informant's at target districts were small ruminant diseases where our focus. The major listed small ruminant diseases were Albatii (PPR/Diarrhea), Marto (Coenorus cerebral), leydaa/Qndhoo (general symptom), Qawessa (Anthrux/wanadu), Saalaa, chittoo/Mange mites/ External parasites, Botote/Botorsa (Skin disease/Sheep and goats pox), Abdera/Deraba (orf), and Saallessa (gatachiisaa/ Brucellosis), somba/ \ccpp, Onkkobo/okkolchiisa/ maasa/ FMD, Shilmii/ Tick infestation, were discussed as a major problem of small ruminants production the Districts.

Seasonal calendars

The participants have presented that there are three seasonal calendars they use in their livelihoods basis these include Hagaya (spring season), Bona (winter season), and onkololeessa (summer season). In Hagaya (spring season), they get rains and this time they receive rain where pasture and shrubs becomes bloom and shiny.

Flock visits

There were no active case mentioned and no flock visited

Summary and analysis of results

The main small ruminant constraints listed by key informant's target districts were small ruminant disease, shortage of the feed, shortage of drinking water; poor animal health service coverage and drought were listed in both districts. In district, Drought and disease are mentioned the major challenge to the production of small ruminant.

A disease like PPR, CCPP, SGpox, Anthrux, and FMD were the main small ruminant disease mentioned. Even though key informants of both district were not reported diseases that case definition fits the clinical sign of pneumo-enteritis syndrome during PDS performance time, But in both districts they prioritized PPR disease, CCPP and SGpox the main disease of small ruminants in their district by PDS team during the field using PDS tools.

Recommendations

Based on conclusion the current assessed information obtain in the districts, namely; Daweserer, and Dawekechen districts are high risk ones for PPR and CCPP because of the history of the endemic of the disease, they are a known animal market centers of the region and high flock movement in both districts. These observations of PDS lead to the following recommendations:

Since high flock movements and market center of the districts the disease might come from high risk area especially Somali region by market routes so that emphasis should be given to control by market surveillance to get active case and in the neighboring districts of Somali region PDS should perform. In Daweserer district Somali region might be a pocket for PPR because there are large number of goats in the region which reared by "somali" ethnic groups. This district bordered by Somali region, where there are large populations of small ruminants.

Therefore, PPR vaccination campaign should recommendable for these districts in coordination with the somali region as interface area. Other concurrent diseases like Sheep and goat pox and CCPP are also problem of small ruminant production for the districts, so control measure should be advisable. Active and regular follow up surveillance should perform to know the epidemiological link of the disease for East bale zone to handover the occurrence.

Table.1 Study and target areas of PDS selected Sites in East Bale zone

Zone	District	Date	PA	Villages	GPS Location		Small ruminant population (District)	Ethnic group	key informants number			Distance from Wereda Town
					N	E			M	F	Total	
					East Bale	DaweSaras			03-02-2022	Bared	Bared	
Hantura	Hantura	6.022493 ⁰	41.818271 ⁰	10000			Arsi	14		13	27	25km(From Bared town))
Hantutu	Hantutu	5.996901 ⁰	41.816711 ⁰	15000			Arsi	12		6	18	23 km (From Bared town)
DaweKechen	03-03-2022	Mantokeharawaticha	Gadabala	6.661251 ⁰		40.992896 ⁰	12000	Arsi	12	16	28	3km(from Mi'o)
		DibeKilofta	Dibe	6.736502 ⁰		40.909206 ⁰	15000	Arsi	17	15	32	18 km from Mi'o
	03-04-2022	ArdaOyru	Biyo	6.847353 ⁰		40.864625 ⁰	7000	Arsi	16	12	28	23km(from Mi'o)

Table.2 The PDS team composed of the following personnel

S.No.	Name of PDS team	Position	Responsibility	Organization
1	Dr Abdissa Lemma	Expert	Facilitator	ARVL
2	DebelaHunduma	Expert	Data Recorder	ARVL
3	Mr.AyelaFayisa	driver	Driver	ARVL
4	Teleha Mohammed	District expert	Translator	Dawesarar District
5	Dr.TilahunRegassa	District expert	Translator	Dawekechen District
6	Mohamed'HusenJemal	Zone expert	Facilitator	East Bale Zone

Table.3 Rank of Livestock species based on estimated number of population in Dawe serer

S.No.	Livestock kept	PAs			Overall ranks
		Bared	Hantura	Hantutu	
1	Goats	1	1	1	1
2	sheep	2	2	2	2
3	cattle	3	3	3	3
4	Camel	4	4	4	4
5	Donkey	5	5	5	5
6	Bee	7	7	7	7
7	poultry	6	6	6	6

Table.4 Rank of Livestock species Based on economic importance in Dawe serer

S.No.	Livestock kept	PAs			Overall ranks
		Bared	Hantura	Hantutu	
1	Goats	1	1	1	1
2	sheep	2	5	3	3
3	cattle	4	4	4	4
4	Camel	3	2	2	2
5	Donkey	6	3	5	5
6	Bee	7	6	7	7
7	poultry	5	7	6	6

Table.5 Rank of Livestock species based on estimated number of population in Dawekechen

S.No.	Livestock kept	PAs			Overall ranks
		Dibekilofta	Ardaoyru	Mantokeharawaticha	
1	Goats	1	1	1	1
2	sheep	2	2	2	2
3	cattle	3	3	4	3
4	Camel	6	6	6	6
5	Donkey	4	4	5	4
6	Bee	7	7	7	7
7	poultry	5	5	3	5

Table.6 Rank of Livestock species Based on economic importance in Dawekechen

S.No.	Livestock kept	PAs			Overall ranks
		Dibekilofta	Ardaoyru	Mantokeharawaticha	
1	Goats	1	1	1	1
2	sheep	4	4	2	3
3	cattle	2	2	3	2
4	camel	3	7	4	4
5	Donkey	5	5	5	5
6	Bee	7	6	7	7
7	poultry	6	3	6	6

Table.7 Rank of Livestock species based on estimated number of population in East Bale Zone

S.No.	Livestock kept	Districts		Overall zonal ranks
		Dawe serer	Dawekechen	
1	Goats	1	1	1
2	sheep	2	2	2
3	cattle	3	3	3
4	Camel	4	6	5
5	Donkeys	5	4	4
6	Bee	7	7	7
7	poultry	6	5	6

Table.8 Rank of Livestock species Based on economic importance in East bale zone

S.No.	Livestock kept	Districts		Overall zonal ranks
		Dawe serer	Dawekechen	
1	Goats	1	1	1
2	sheep	3	3	3
3	cattle	4	2	2
4	Camel	2	4	4
5	Donkeys	5	5	5
6	Bee	7	7	7
7	poultry	6	6	6

Table.9 Major challenges of livestock production ranked by Target informants

S.No.	Major livestock production constraints	Dawe serer	Dawekechen
1	Diseases of livestock	3	3
2	Shortage of grazing land (feed)	5	5
3	Lack of Market	4	6
4	Drought	1	1
5	Poor coverage of Veterinary services	6	4
6	Shortage of water	2	2

Table.10 Community prioritized small ruminants of Diseases ranked in Dawe serer and Dawekechen districts of East Bale zone

S.No	Local name of diseases	Scientific name of diseases	Summary rank of the districts	
			Dawe serer	Dawekechen
1	Albatii	PPR	1	1
2	Qawessa	Anthrux	4	4
3	Marto	Coenorur cerebral	9	9
4	Botote/Botorsa	Sheep and goat pox	3	3
5	chittoo	Mange mites/External parasites	8	8
6	Abdera/Deraba	Orf	10	10
7	Saallessa(gatachiisaa/	Brucellosis	5	5
8	Somba/ Qufa	CCPP	2	2
9	Onkkobo/okkolchiisa	FMD	6	6
10	Shilmii	Tick infestation	7	7

Table.11 Community perception of local diseases and their clinical signs

Local name	Scientific Name	Clinical signs Morbidity, mortality	Post mortem signs	Species and age groups	Cause	Occurrence – seasonal, annual, sporadic	Treatment, prevention	Possible differential diagnosis*
Albatii	PPR	Coughing, diarrhoea, nasal and ocular discharge	Damage intestine and internal organs	Both species and all age	unknown	seasonal	No treatment	CCPP, FMD, ORF, SGpox
Qawessa	Anthrux	Sudden death		Both species and all age	Spore feed after rainy season	sporadic	Procaine penicilline	Blackleg
Marto	Coenurus cerebral	Circling of the animal		Both species and all age	unknown	Throughout the year	No treatment	
Botote/Botorsa	Sheep and goat pox	Skin nodules and lesion	Lung damage	Both species and all age	contagious	Dry season/stress	No treatment	CCPP, PPR
chitto	Mange mites/External parasites	Skin nodules and lesion Existence of parasites, hair lose		Both species and all age	Parasite infestation	Rainy season	Deworming/pasture management	Ectoparasites
Abdera/Deraba	Orf	Wound around the mout	-	Both specie and young age	After Rainy season	sporadic	No treatment	SGpox, PPR
Saallessa(gatachiisaa/	Brucellosis	Abortion		Both species and adult age group	Contact	Wet seasonal	Procaine penicilline	
Somba/ Qufa	CCPP	Salivation, coughing	Lung damage	All species and all age	contagious	Dry season	No treatment	SGP, PPR, FMD, orf
Onkkobo/okkolchiisa	FMD	Lamness, difficult to move		All species and all age	contagious	after spring	No treatment	SGP, PPR, CCPP, orf
Shilmii	Tick infestation	Emaciation, Skin nodules and lesion		All species and all age	Tick infestation	After rainy season	Deworming/pasture management	Ectoparasites

Table.12 Timelines of diseases outbreak last five years in the districts

No.	Timelines	Rank in districts	
		Dawe serer	Dawekechen
1	2021/2022	drought	drought
2	1996/2009	drought	drought
3	1996/2009	Unknown camel disease	Unknown camel disease
4	2016	Border war	Border war

Table.13 Seasonal calendar of the year, small ruminant major Diseases

S/N	Disease	Season of the year		
		Hagaya	Bona	Onkololessa
1	PPR	xxx	x	x
2	Anthrux		xxx	x
3	Coenorus cerebral	Xx	x	xx
4	Sheep and goat pox	Xx	xxx	x
5	Mange mites/External parasites	X	xx	x
6	Orf	Xx		x
7	Brucellosis	X	xx	x
8	CCPP	X	xxxxx	x
9	FMD	Xx	xxx	xx
10	Tick infestation	Xx	x	xx

Table.14 Summary and Analysis of PES PDS

Interview date	location	No. of participants	Major small ruminant disease	Disease that fit PES case definition	Any current report of disease fitting PES case definition	No. of PES cases found and result of investigation	Other clinical cases seen
02-11-2022	Bared	13	SGpox,Orf,PPR,CCPP	-	-	-	-
02/11/2022	Hantura	27	SGpox,Orf,PPR,Anthrux CCPP	-	-	-	-
02/11/2022	Hantutu	18	SGpox,Orf,PPR,Anthrux CCPP	-	-	-	-
03/11/2022	Dibekilofta/Dibe	32	SGpox,Orf,PPR,Anthrux CCPP, FMD	-	-	-	-
03/11/2022	Ardaoyru/Biyo	28	SGpox,Orf,PPR,Anthrux CCPP,FMD	-	-	-	-
04/11/2022	Mantokeharawaticha/Gadabala	28	SGpox,Orf,PPR,Anthrux CCPP,FMD	-	-	-	-

Fig.1 Participatory mapping Daweserer District by expert (2022)

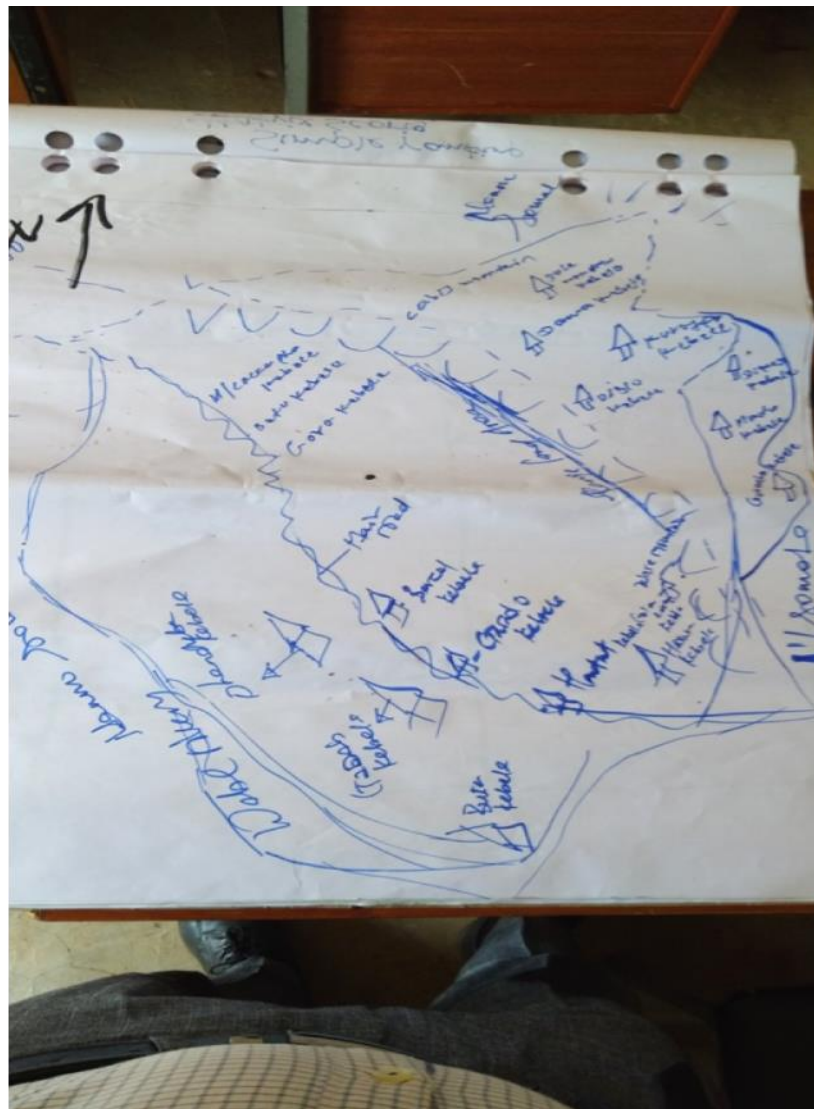


Fig.2 Participatory mapping Bared PA, Daweserar District by the community (2022)



Fig.3 Participatory mapping Hantutu PA, Daweserer District by the community (2022)

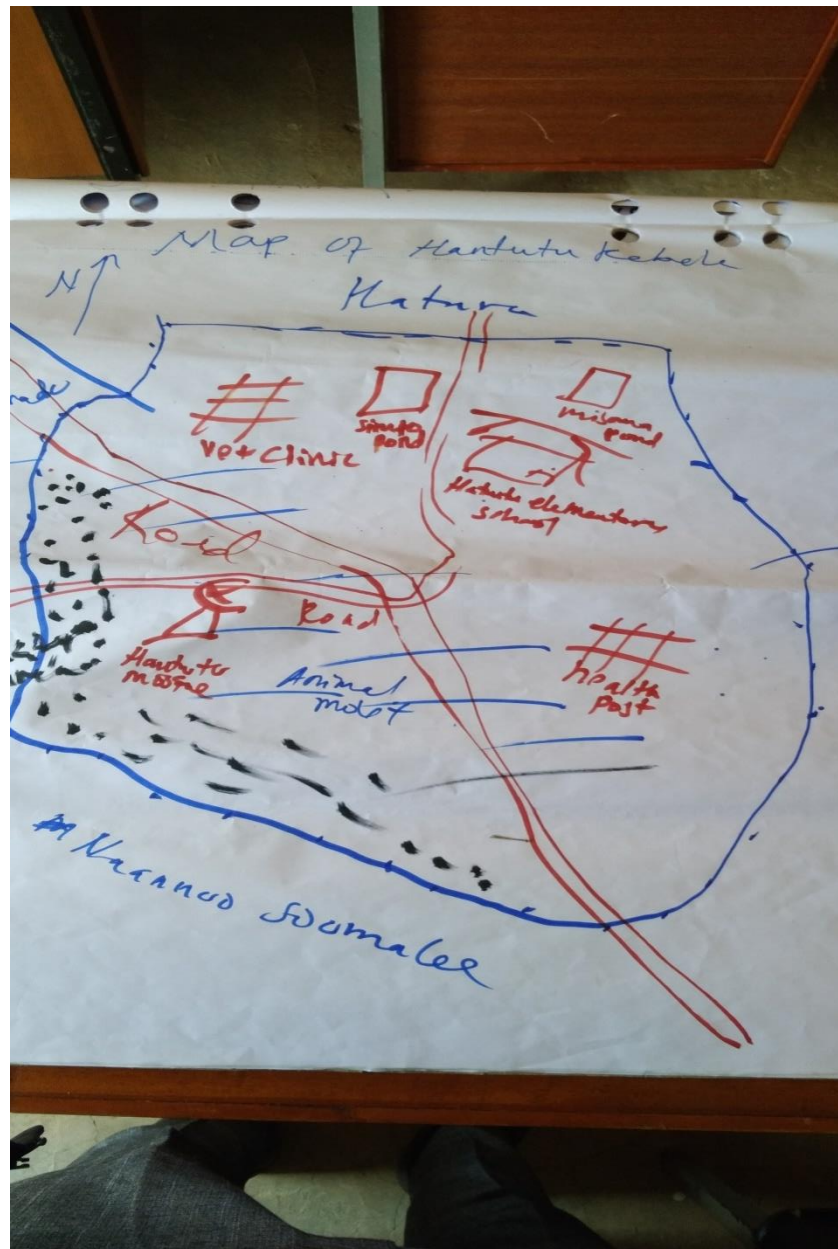


Fig.4 Participatory mapping Hantura PA, Daweserer District by the community (2022)



Fig.5 Participatory mapping dawekechen District by expert (2022)



Fig.6 Participatory mapping Dibekilofta PA, Dawekechen District by the community (2022)



Fig.7 Participatory mapping Ardaoyru PA, Dawekechen District by the community (2022)

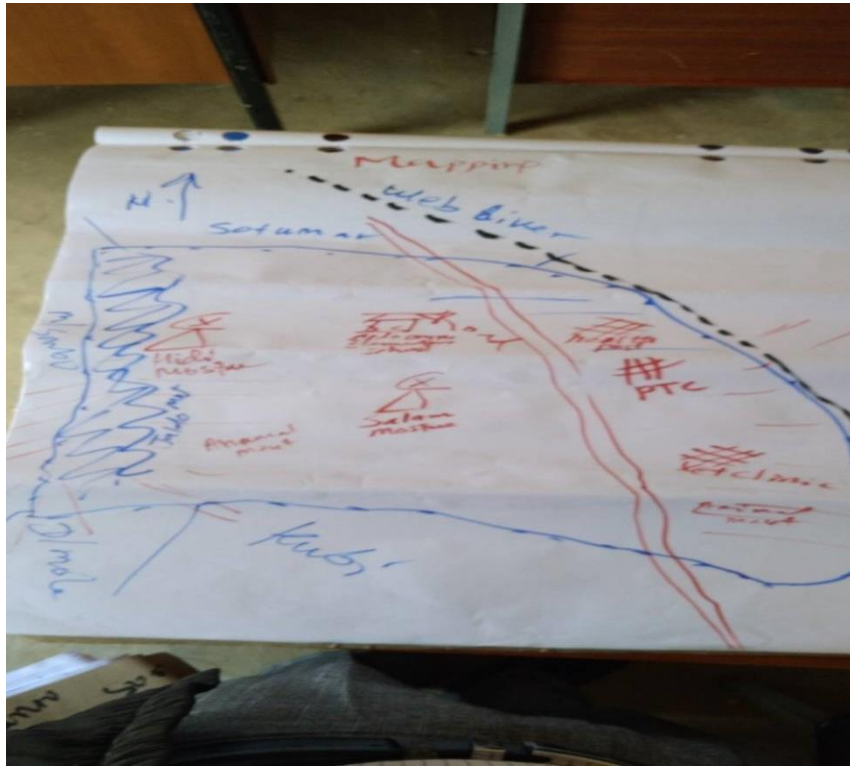


Fig.8 Participatory mapping mantokeharawaticha PA, Dawekechen District by the community (2022)



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