

CHAPTER VIII

FARM IMPLEMENTS, DRAUGHT ANIMALS AND STORAGE FACILITIES

1. INTRODUCTION

Agriculture is the single largest sector in the Ethiopian economy. The position of the agricultural sector for the past few decades does not only concern the peasants, but on account of the extent of its inputs, outputs and its function as a largest employer of labour has a profound impact on the entire economy. It is worth to point-out that Ethiopia has large resources in terms of land, agricultural labour, draught animals...etc.

Despite all these facts, the average yield of the main food crops and livestock products attained by private peasant holders is very low and it is not adequate to feed the ever-growing population. Because of such prevailing conditions in the agricultural sector, the economy remained at subsistence level. Among the factors that hampered the country not to prosper is the use of primitive farm implements and tools by the peasants to operate their land and to raise livestock.

The role of improved agricultural implements and tools in raising the standard of farming efficiency and increasing average yield of production has been recognized for many years. Land preparation requires modern power source that results in considerable farm efficiency and expansion of production. Sowing and fertilization are among the few agricultural operations where animal and tractor drawn machines appear to be capable of greater efficiency than only hand method. Power-driven line sowing and fertilization are more efficient than hand spreading and this is usually expected to result in higher yield for the same amount of fertilizers and seeds.

The traditional unimproved farm implements used by the peasants and the poor conditions of the draught animals are considered to be among the main factors that retarded the agricultural productivity in the country. On the other hand, the development of farm implements and machineries can also be crippled by small land

size holdings, abundant labour in rural area and non-availability of adequate access to modern farm implements and machineries, which the private peasant holders can afford to rent or buy. In general, effective development of farm implements and machineries takes place when land is abundant and labour is being rapidly absorbed by non-agricultural sector, (WB, 1984)

Since development programmes are in progress in Ethiopia, data generated from censuses and sample surveys on different types of agricultural outputs and inputs are necessary for assessments, evaluation and formulation of programmes and policies in the sector. One of the objectives of this census was to provide benchmark data that can help to assess the growth, quantity, quality and value of farm implements and other farm equipment used by the private peasant holders so as to easily identify the implements that are abundant and those that are in short supply. The structural characteristics of these farm implements and other farm equipment do not change much from year to year and such data are usually obtained from a census of agriculture, which is conducted every 5 or 10 years. Data on farm implements and other farm equipment were not collected in Ethiopia and much is not known about the status and growth of these implements. Thus, in the Ethiopian agricultural census conducted in 2001/2002, data was collected on farm implements and other farm equipment. These farm implements include, implements used for clearing land, cultivation, harvesting, threshing and others. In this census draught animals comprises animals engaged specifically in ploughing, threshing and farm transport facilities. Replacement value was one of the variables covered by this census. Replacement value is the amount it would cost to replace farm implements, equipment, draught animals and storage facilities with those that are similar in terms of origin, age, quality or condition.

In this chapter the classification of farm implements, farm equipment, draught animals and storage facilities are presented in Section 2. Brief discussions of data on Summary Tables VIII.1 to VIII.4 are also provided in Section 3. Finally, the estimates, Standard Errors (S.E.) and Coefficients of Variation (C.V.) on number of holders reporting, number of farm implements reported and total value are presented in the Annex Tables

2. CLASSIFICATION OF FARM IMPLEMENTS, OTHER FARM EQUIPMENT AND DRAUGHT ANIMALS

The farm implements and draught animals reported were classified into the following eight groups: -

- Implements used for clearing land,
- Implements used for cultivation,
- Parts for traditional plough,
- Implements used for harvesting,
- Implements used for threshing,
- Other farm equipment,
- Draught animals for farm activity, and
- Storage facilities.

These eight groups further broken down to include the following implements and other farm equipment:

2.1 Implements used for clearing land

- a) Axes,
- b) 'Gejera '(Chopper), and
- c) Shovel.

2.2 Implements used for cultivation

- a) Hoe,
- b) 'Mekeskesha',
- c) Pick-Axe, and
- d) Tractor.

2.3 Parts for traditional plough

- a) 'Diger',
- b) ' Erfe',
- c) Plough-Beam,
- d) Plough-Tip, and
- e) 'Wegel'-Tip.

2.4 Implement used for harvesting

- a) Sickle.

2.5 Implements used for threshing

- a) Hay- Fork (metal or wood),
- b) Threshing stick, and
- c) Winnowing (metal or wood).

2.6 Other farm equipment

- a) Cart (hauling),
- b) Sprayer (hand operated),
- c) Sprayer (power operated),
- d) Tying tool, and
- e) Wheelbarrow.

2.7 Draught animals

- a) Animals deployed specifically in ploughing.
 - Ass/Donkey,
 - Camel,
 - Horse,
 - Mule, and
 - Ox.
- b) Animals deployed in threshing or transportation:-
 - Ass/Donkey,
 - Camel,
 - Cattle (Working Age),
 - Horse, and
 - Mule.

2.8 Storage facilities

- a) 'Debignet' (Local storage),
- b) 'Gottera' (Local storage),
- c) 'Gudguad' (Local storage), and
- d) Modern storage.

Definitions of storage facilities

'Debignet': - Is a round vessel of earthenware storage attached with the wall of a house. The shape of 'Debignet' is similar to the shape of a barrel. Debignet is usually around 1 metre high and 0.5-metres wide.

'Gottera': - Is storage made of bamboo plant. The bamboo is split and then crisscrossed and woven like a giant basket. Finally, it is laminated with a mixture of animal dung and dry grass. 'Gottera' is usually about 1-3 metres high and about 1 metre wide

'Gudguad': - Is an underground storage, which is formed by digging the ground with certain depth and radius. The wall of 'Gudguad' is usually laminated with animal dung.

Modern storage: - Is a storage that has a better quality in protecting grains from humidity and pests than the above mentioned storages.

3. ESTIMATES OF FARM IMPLEMENTS, DRAUGHT ANIMALS AND STORAGE FACILITIES

The type, quality and quantity of tools and implements in use usually indicate the level of farming practice and agricultural development of a country. Hence, the results of this census can give us some highlights to evaluate the farming system in the region. In this report farm implements are grouped in terms of their operation and this can help to make appropriate comparisons.

3.1 Farm Implements and Tools

The data in Summary Table VIII.1 indicates that the number of holders reporting axe was the highest followed by 'Gejera'(Chopper) while shovel was the lowest. In Dre Dawa Administrative Council it is estimated that there were about 14,116 crop holders in rural areas of which about 12,925 (91.56%) reported to own shovels, about 85.36% reporting axe, and 4.03% reporting 'Gejeras' (choppers). Among the farm implements used for clearing land the number of observation for axe was highest and the total value for axe was also the highest followed by shovel and 'Gejera'. The expected duration of service of an axe and 'Gejeras' was estimated to be 9 years each, while for shovel it was 3 years. The data in Summary Table VIII.4 revealed that the percentage distribution of the number of crop holders that owned one, two, three and, four hoes was 58.98%, 8.99%, 1.71% and 0.29% respectively. On the other hand it is also shown that 30.02%, 93.41% and 95.32% of the crop holders did not own hoe, 'Mekeskesha' and pick-axe respectively.

One of the labour and power intensive farm activities is cultivation. It comprises digging, ploughing, sowing and weeding. In order to accomplish such operations, the Ethiopian peasants use hoe, 'Mekeskesha', pick-axe, and traditional plough. Among these farm implements and tools hoe was the highest in terms of number of holders reporting, total number of implements reported and total value. The second highest in terms of number of holders reporting and quantity reported was 'Mekeskesha'. It is also shown that sickle is reported as the only harvesting tool. For details, see Summary Table VIII.1.

3.2 Draught Animals

Peasants in Ethiopia use domestic animals for draught purposes. In several parts of the country where holdings are far from residence as a result asses, horses, mules and camels are used to transport various types of goods and agricultural products from holding to residence and vice-versa. As it is indicated in Summary Table VIII.2 among the domestic animals that are used for ploughing, ox was the highest in terms of number of holders reporting, number of oxen reported and total value which amounted to 4.2 million Birr. About 4,783 holders (33.88% of the total crop holders in the Administrative Council) reported 6,751 cattle (working age cattle) used for threshing

and these cattle had a value of over 3.9 million Birr and the average replacement value of a working age cattle was about 410.17 Birr. It was also indicated that asses and camels were used by the holders for threshing and transportation.

The estimated number and percentage distribution of crop holders in rural areas that owned implements, equipment and draught animals are shown in Summary Table VIII.4. In Dre Dawa Administrative Council the census result shows that there were about 14,116 crop holders in rural areas. Among these 26.71%, 9.41%, 1.31% and 0.22% holders owned one, two, and three and four oxen respectively. On the other hand about 62.35% of the holders did not own ox. For details, see Summary Table VIII.4.

3.3 Storage Facilities

One of the methods that minimize post harvest production losses is the usage of modern storage facilities. During the census data was collected on modern storage facilities and the unimproved local storage facilities such as 'Debignit', 'Gottera' and 'Gudguad'. In this census, buildings or any structure used as storage facilities and other containers that have better storage quality to protect agricultural products from humidity and pests are considered as modern storage facilities.

The data in Summary Table VIII.3 shows the number of holders reporting storage facilities and number of such facilities. Thus, the data in the table reveals that 'Gudguad' was reported by the highest number of holders. On the other hand, 'Gottera' and modern storage facility was reported by insignificant number of holders. The percentage distribution of the number of crop holders that owned 'Gudguad' and 'Debignit' is also presented in Summary Table VIII.4.

SUMMARY TABLE VIII.1: -Number and Percentage of Holders Reporting implements and Other Farm Equipment by Type, Quantity Reported, Replacement Value, and Duration of Implement, for Private holdings

Implements and Equipment	Number of Holders Reporting	Percent of Total Holders	Number of Implements and Equipment		Total Value (Birr)	Average Replacement Value Per Imp. & Eq. (Birr)	Average Duration of Service of Imp. & Eq. (Years)
			Total Reported	#Average Per Holder			
Used for Clearing Land							
Axes	12,049	85.36	18,818	1.33	236,312	7.68	9
'Gejeras' (Choppers).....	569	4.03	607	0.04	6,602	10.10	9
Shovels.....	12,925	91.56	16,050	1.14	135,090	6.66	3
Used for Cultivation							
Hoes.....	9,878	69.98	11,755	0.83	239,543	17.03	5
'Mekeskeshas'.....	930	6.59	1,204	0.09	*	*	3
Pick-Axes.....	661	4.68	661	0.05	8,167	12.36	9
Tractors	-	-	-	-	-	-	-
Parts for traditional Plough							
'Degers'	4,994	35.38	6,824	0.48	31,649	3.39	2
'Erfes'.....	4,885	34.61	5,361	0.38	16,435	2.79	1
Plough-Beams	5,389	38.18	5,604	0.40	112,429	19.46	5
Plough- Tips	5,747	40.71	6,264	0.44	91,761	13.63	4
'Wegel' -Tips.....	5,179	36.69	5,456	0.39	33,172	5.62	3
Yokes	5,388	38.17	5,880	0.42	86,301	14.07	5
Used for Harvesting							
Sickles.....	3,373	23.89	3,682	0.26	29,858	7.42	5
Used for Threshing							
Hay-Forks (metal)	222	1.57	222	0.02	2,786	12.55	7
Hay-Forks (wood).....	3,494	24.75	3,642	0.26	18,659	5.02	4
Threshing Sticks	6,700	47.46	10,421	0.74	29,080	1.88	2
Winnowers (metal).....	103	0.73	103	0.01	1,173	11.39	6
Winnowers (wood).....	4,031	28.56	4,370	0.31	46,231	9.88	7
Other farm Equipment							
Carts	-	-	-	-	-	-	-
Sprayers (Hand operated)	-	-	-	-	-	-	-
Sprayers (Power operated)	-	-	-	-	-	-	-
Tying Tools.....	-	-	-	-	-	-	-
Wheelbarrows	*	-	*	*	*	*	*

Average per holder is the ratio of total number of each implement reported to total number of crop holders in rural areas in the region.

- Total number of crop holders comprises, holders participated in crop production only and both crop production and livestock rearing.

SUMMARY TABLE VIII.2: -Number and Percentage of Holders Reporting Draught Animals, Quantity Reported, Replacement Value, and Duration of Implement, for Private Holdings

Animals	Number of Holders Reporting	Percent of Total Holders	Number of Animals		Total Value of Animals (Birr)	Average Replacement Value Per Animal (Birr)	Average Age of Animal (Years)
			Total Reported	#Average Per Holder			
Used for Ploughing							
Asses	*	-	*	*	*	*	*
Camels	-	-	-	-	-	-	-
Horses	-	-	-	-	-	-	-
Mules	-	-	-	-	-	-	-
Oxen	5,314	37.65	7,106	0.50	4,260,074	440.94	5
Used for Threshing or Transportation							
Asses	6,261	44.35	6,728	0.48	1,637,754	226.88	10
Camels	2,244	15.90	2,986	0.21	2,495,409	621.01	10
Cattle	4,783	33.88	6,751	0.48	3,944,079	410.17	5
Horses	-	-	-	-	-	-	-
Mules	*	-	*	*	*	*	*

Average per holder is the ratio of total number of each draught animal reported to total number of crop holders in rural areas in the region.
- Total number of crop holders comprises, holders participated in crop production only and both crop production and livestock rearing.

SUMMARY TABLE VIII.3: - Number and Percentage of Holders Reporting Storage facilities, Quantity Reported, Replacement Value, and Storage Capacity, for Private Holdings.

Storage Structure	Number of Holders Reporting	Percent of Total Storage Holders	Number of Storages		Total Value of Storages (Birr)	Average Replacement Value Per Storage (Birr)	Average Storage Capacity Per Storage (Quintal)
			Total Reported	#Average Per Holder			
'Debignits'	1,471	10.42	1,924	0.14	22,759	9.71	2
'Gotteras'	*	-	*	*	*	*	*
'Gudguads'	11,567	81.94	11,847	0.84	596,271	49.45	9
Modern Storage Structures	*	-	*	*	*	*	*

Average per holder is the ratio of total number of each storage structure reported to total number of crop holders in rural areas in the region.
- Total number of crop holders comprises, holders participated in crop production only and both crop production and livestock rearing.

SUMMARY TABLE VIII.4: -Number of Crop Holders that Owned Farm Implements, Equipment and Draught Animals.

Name of Implement, Equipment, and Draught Animal	Number of Crop holders that owned											
	No Implement, Equipment, or Draught Animal		One Implement, Equipment, and Draught Animal		Two Implements, Equipment, and Draught Animals		Three Implements, Equipment, and Draught Animals		Four Implements, Equipment, and Draught Animals		Five and above Implements, Equipment, and Draught Animals	
	Holders	%	Holders	%	Holders	%	Holders	%	Holders	%	Holders	%
Used for Clearing Land												
Axes	2,068	14.65	6,895	48.85	4,005	28.37	831	5.89	268	1.90	49	0.35
'Gejera'	13,547	95.97	531	3.76	38	0.27	-	-	-	-	-	-
Shovel	1,191	8.44	10,294	72.92	2,290	16.22	222	1.57	85	0.60	34	0.24
Used for Cultivation												
Hoes	4,238	30.02	8,326	58.98	1,269	8.99	242	1.71	41	0.29	-	-
'Mekeskeshas'	13,186	93.41	690	4.89	206	1.46	34	0.24	-	-	-	-
Pick Axes	13,455	95.32	661	4.68	-	-	-	-	-	-	-	-
Tractors	14,116	100.00	-	-	-	-	-	-	-	-	-	-
Parts for traditional Plough												
'Degers'	9,122	64.62	3,383	23.97	1,501	10.63	-	-	110	0.78	-	-
'Erfes' (Handle)	9,231	65.39	4,578	32.43	204	1.45	37	0.26	66	0.47	-	-
Plough-Beam	8,726	61.82	5,175	36.66	215	1.52	-	-	-	-	-	-
Plough -Tips	8,369	59.29	5,261	37.27	453	3.21	33	0.23	-	-	-	-
'Wegel' -Tips	8,937	63.31	4,991	35.36	116	0.82	53	0.38	19	0.13	-	-
Yokes	8,728	61.83	5,166	36.60	188	1.33	-	-	-	-	34	0.24
Used for Harvesting												
Sickles	10,743	76.11	3,117	22.08	227	1.61	16	0.11	-	-	13	0.09
Used for Threshing												
Hay-Forks (Metal)	13,894	98.43	222	1.57	-	-	-	-	-	-	-	-
Hay-Forks (Wood)	10,622	75.25	3,383	23.97	92	0.65	-	-	19	0.13	-	-
Threshing Sticks	7,417	52.54	4,700	33.30	1,267	8.98	269	1.91	261	1.85	202	1.43
Winnowers (Metal)	14,013	99.27	103	0.73	-	-	-	-	-	-	-	-
Winnowers (Wood)	10,085	71.44	3,692	26.15	339	2.40	-	-	-	-	-	-
Other Farm Equipment												
Carts	14,116	100.00	-	-	-	-	-	-	-	-	-	-
Sprayers (Hand Operated)	14,116	100.00	-	-	-	-	-	-	-	-	-	-
Sprayers (Power Operated)	14,116	100.00	-	-	-	-	-	-	-	-	-	-
Tying Tools	14,116	100.00	-	-	-	-	-	-	-	-	-	-
Wheelbarrows	13,799	97.75	293	2.08	24	0.17	-	-	-	-	-	-
Animals Used for Ploughing												
Asses	14,076	99.72	40	0.28	-	-	-	-	-	-	-	-
Camels	14,116	100.00	-	-	-	-	-	-	-	-	-	-
Horses	14,116	100.00	-	-	-	-	-	-	-	-	-	-
Mules	14,116	100.00	-	-	-	-	-	-	-	-	-	-
Oxen	8,802	62.35	3,770	26.71	1,328	9.41	185	1.31	31	0.22	-	-
Animals Used for Threshing or Transportation												
Asses	7,856	55.65	5,868	41.57	318	2.25	74	0.52	-	-	-	-
Camels	11,871	84.10	1,791	12.69	367	2.60	-	-	33	0.23	54	0.38
Cattle	9,333	66.12	3,188	22.58	1,315	9.32	185	1.31	95	0.67	-	-
Horses	14,116	100.00	-	-	-	-	-	-	-	-	-	-
Mules	14,058	99.59	58	0.41	-	-	-	-	-	-	-	-
Storage Structure												
'Debignits'	12,645	89.58	1,037	7.35	414	2.93	20	0.14	-	-	-	-
'Gotteras'	13,957	98.87	139	0.98	20	0.14	-	-	-	-	-	-
'Gudguads'	2,549	18.06	11,464	81.21	81	0.57	-	-	-	-	22	0.16
Modern Storages	14,095	99.85	21	0.15	-	-	-	-	-	-	-	-

ANNEX TABLES PRESENTING
ESTIMATES, STANDARD ERRORS AND
COEFFICIENT OF VARIATION
FOR SELECTED FARM IMPLEMENT VARIABLES

Annex Tables 8.1

ANNEX TABLE 8.1: - Standard Errors and Coefficient of Variations For the Number of Holders Reporting, Quantity Reported and Total Value, for Private Holdings, Dre Dawa Administrative Council.

Implements, Equipment, Farm animals and Storage facilities				Number of Implements, Equipment, Farm animals and Storages					
	Number of Holders						Total Value		
	Reporting	S.E	C.V	Reported	S.E	C.V	(Birr)	S.E	C.V
Used for Clearing Land									
Axes	12,049	717.27	5.95	18,818	1,287.77	6.84	236,312	3,027,639.81	12.81
'Gejeras'	569	265.57	46.64	607	281.51	46.34	6,602	255,334.93	38.68
Shovels	12,925	708.94	5.48	16,050	997.51	6.21	135,090	1,534,500.61	11.36
Used for Cultivation									
Hoes	9,878	774.35	7.84	11,755	1,041.54	8.86	239,543	3,985,088.26	16.64
'Mekeskeshas'	930	398.44	42.84	1,204	529.99	44.01	*	*	*
Pick-Axes	661	157.25	23.79	661	157.25	23.79	8,167	195,437.33	23.93
Tractors	-	-	-	-	-	-	-	-	-
Parts for traditional Plough									
'Degers'	4,994	585.85	11.73	6,824	838.90	12.29	31,649	525,239.93	16.60
'Erferes' (Handle)	4,885	599.36	12.27	5,361	647.67	12.08	16,435	255,801.67	15.56
Plough-Beams.	5,389	600.19	11.14	5,604	609.29	10.87	112,429	1,852,774.84	16.48
Plough -Tips (Metal)	5,747	678.17	11.80	6,264	739.84	11.81	91,761	1,419,138.81	15.47
'Wegel' -Tips	5,179	605.49	11.69	5,456	646.56	11.85	33,172	582,551.59	17.56
Yokes	5,388	611.57	11.35	5,880	747.27	12.71	86,301	1,513,217.53	17.53
Used for Harvesting									
Sickles	3,373	460.99	13.67	3,682	513.58	13.95	29,858	480,302.55	16.09
Used for Threshing									
Hay-Forks (Metal)	222	73.88	33.35	222	73.88	33.35	2,786	103,140.65	37.02
Hay-Forks (Wood)	3,494	431.52	12.35	3,642	451.46	12.40	18,659	349,996.18	18.76
Threshing Sticks	6,700	843.64	12.59	10,421	1,321.53	12.68	29,080	439,884.77	15.13
Winnowers (Metal)	103	44.34	43.06	103	44.34	43.06	1,173	57,653.00	49.14
Winnowers (Wood)	4,031	419.75	10.41	4,370	451.80	10.34	46,231	759,408.34	16.43
Other Farm Equipment									
Carts (Hauling)	-	-	-	-	-	-	-	-	-
Sprayers (Hand Operated) ..	-	-	-	-	-	-	-	-	-
Sprayers (Power Operated)	-	-	-	-	-	-	-	-	-
Tying Tools	-	-	-	-	-	-	-	-	-
Wheelbarrows	*	*	*	*	*	*	*	*	*
Animals Used for Ploughing									
Asses	*	*	*	*	*	*	*	*	*
Camels	-	-	-	-	-	-	-	-	-
Horses	-	-	-	-	-	-	-	-	-
Mules	-	-	-	-	-	-	-	-	-
Oxen	5,314	597.48	11.24	7,106	836.87	11.78	4,260,074	52,642,014.93	12.36
Animals Used for Threshing or Transportation									
Asses	6,261	613.38	9.80	6,728	661.25	9.83	1,637,754	17,991,621.68	10.99
Camels	2,244	483.15	21.53	2,986	678.09	22.71	2,495,409	63,808,878.17	25.57
Cattle	4,783	731.10	15.29	6,751	1,074.45	15.91	3,944,079	62,437,108.09	-
Horses	-	-	-	-	-	-	-	-	*
Mules	*	*	*	*	*	*	*	*	15.83
Storage Structure									
'Debignits'	1,471	424.34	28.85	1,924	573.39	29.80	22,759	636,730.52	27.98
'Gotteras'	*	*	*	*	*	*	*	*	*
'Gudguads'	11,567	856.79	7.41	11,847	912.09	7.70	596,271	8,102,510.35	13.59
Modern Storages	*	*	*	*	*	*	*	*	*