MARKET ACCESS AND MARKETING OF *TEF*: The Case of West Shewa Zone

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Abstract

Tef is a unique grain produced for human consumption purpose only in Ethiopia. It has also a peculiar character in production and marketing. This study was conducted at farmers and market participant level mainly in Adaberga and Dendi weredas of west shewa zone. Direct observation, focus group discussion, semi-structured interview and questionnaires were used to collect qualitative and quantitative information. Moreover, sixteen years price data used to analyze the behavior of tef price. The study identified two types of markets, major markets and village markets. In both weredas there were a total of 22 markets, nine in Dendi and the rest in Adaberga. The study showed that a single market on average serves for 22,990 and 7750 populations of the agricultural households in Dendi and Adaberga, respectively. These markets were evenly distributed in the study areas. The study weredas were identified as among the surplus tef producing areas. The market surplus obtained from Dendi estimated to be 47, 309 quintal while for Adaberga it is 33,748 quintal. The price analysis showed that in west Shewa, tef price seasonality exists indicating the need for storage. The gross return to storage was estimated 15.8 percent over 5 months.

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1. INTRODUCTION

In Ethiopia, *tef* is produced mainly for the purpose of local consumption. Productivity of *tef* is the lowest of cereal crops when it is compared with others like maize and wheat. The national average was 8.95 qt per hectare for *tef* which is 58 percent below national maize yield and 38 percent below national wheat yields. This is probably due to short period of time elapsed in improving *tef* genotype; and limited research personnel and facilities in charge of *tef* research. *Tef* improvement program started at national level before three decades in Debrezeit research center. Since the beginning of *tef* improvement program a total of 17 cultivars developed. Until recently *tef* research was restricted only to Ethiopia. That made impossible to bring improved genotypes from any other country. *Tef* grows in most of the agro ecology zones of the country. Nationally *tef* ranks first in total cropland coverage and quantity of produce among other cereals. It was sown on average on 22.73 percent of cultivated crop land of the peasant holding in Ethiopia. *Tef* rises as much as 34.19 percent of cultivated cropland in west Shewa zone, which has highest proportion (CACC, 2003). *Injera* made of *tef* is the favorite diet of the citizens.

Consuming *injera* made of *tef* is usually considered as a prestige in the community. Especially, it is a preferred staple food for the better off households. Even, citizens having higher living standard have a preference for white *tef* than red once for sake of social value. These classes of the society usually require consuming *injera* once or twice a day (BOSTID, 1996). This situation makes demand for *tef* is consistent over years. For consumers, its taste and preference is unique making other grains the poor substitute for *tef*. Its demand is inelastic to price variability compared to other grain crops. As the same time, *tef* will not be affected by imported grain for aid. The other advantage mentioned by most of the farmers is the grain will be stored for long time if the grain is harvested once. In the absence of oil crops and horticultural crop; *tef* is the only cash crop for farmers. Price paid for *tef* varies with its quality while the major criterion for quality is color. These days the trend is to produce white *tef* that have a better market value. However, nutrition studies carried out on *tef* indicated red varieties have more ironic content and suitable aroma/ taste than that of the white (Seyfu, 1993).

The unique character of *tef* in production and marketing required to study the marketing aspect of *tef*. *Tef* is produced only in Ethiopia as a grain crop; hence, no studies will be referred from other countries experience. The study, therefore, specifically focuses on market access and marketing of *tef*. The result of this study will contribute a lot to the success of *tef* improvement program.

2.   METHODOLOGY

2.1   The study area

This study was conducted in west Shewa zone; namely, *Dendi* and *Adaberga* which were characterized by crop livestock mixed farming system. *Dendi* represents *vertisoils tef* production area while *Adaberga* represents *nitosoils tef* production area. *Dendi* is located 90 km from Addis on the main road from Addis Ababa to Ambo while *Adaberga* is located 80 km from Addis Ababa towards *Muger* cement factory. These two *weredas* were selected based on their proxy to HARC and scale of *Tef* production in the two study areas.

2.2   Method of data collection and sampling technique

Informal survey was conducted to have a bird eye view of the study area that in turn leads to develop the questionnaire for formal survey. Focus Group Discussion (FGD) was made with farmers, traders, market participants, and relevant governmental and non-governmental organizations to get information on specific issues. Formal questionnaires developed and used to collect relevant information from the farmers with the help of trained high school complete enumerators. The data collection made in the year 2001. A total of 240 farmers from *Dendi* and 180 from *Adaberga* interviewed. Three stage sampling technique used. First, two *weredas* selected from west Shewa zone one from *netosoils* and the other from *vertisoils* production area. Second, in each *weredas* four peasant associations selected purposively for the study considering distance of the peasant association from the main market outlet and its accessibility. Third, farmers were randomly selected from each peasant association. About four years weekly price data obtained from Dendi and Adaberga Bureau of Agricultures and sixteen years price data obtained from Holetta Agricultural Research Center (HARC) which were used for further analysis.

2.3   Analytical technique

The information collected with the help of questionnaire analyzed in a form of simple descriptive statistics. Percentage, mean, pie chart, and bar chart selected, among others, to summarize use of improved varieties, type of *tef* produce supplied to the market, and type of transportation facility used by farmers to transport their *tef* produce. Other statistical packages correlation coefficient, simple linear regression, 12 month moving average, indexes, standard deviation, t-statistics, gross return to storage and others were also used to analyze the data set. Statistical Package for Social Sciences (SPSS) software used to analyze the data.

3.   RESULT AND DISCUSSION

3.1.   Total production and Marketed Surplus
3.1.1   Total production

Relative to other cereals *tef* yield obtained per hectare is the lowest of wheat, barley and maize. The average national yield of *tef* was estimated to be 8.9 q/ha (Hailu and Seyfu, 2001). While the information obtained from Central Agricultural Census Commission (CACC, 2003) indicated *tef* yield per hectare is 10.35 and 11.95 quintals in *Dendi* and *Ada Berga weredas*, respectively (Table 1).

Table 1: Crop land allocated to *Tef* and quantities of *tef* produced and yield per hectare

Weredas	Area		Production		Yield
	Hectare	Percent	Quintal	Percent	qt /ha
Dendi	13,058.06	27.31	135,169.56	19.80	10.35
Ada Berga	8,069.64	32.99	96,424.57	27.11	11.95
National	1,818,374.64	22.73	16,273,155.32	14.32	8.95

Source: CACC

3.1.2   Marketed surplus of tef

Marketed surplus of *tef* depends on the use of improved agricultural technologies, suitable weather condition and on availability of family or hired labor for peak agricultural activities. Acharya et al (1987) indicated marketed surplus can be calculated with the help of linear regression. With the help of formal survey the average four years amount of *tef* produced and sold were obtained from sample farmers. Fitted simple regression revealed that of the total *tef* production, farmers sold on average 35 percent of their produce (Table 2). The remaining consumed and reserved for purpose of seed and transferred to other persons in a form of gift. This finding is in line with the central statistics authority estimate for west *Shewa zone* in which farmers sold 33.4 percent of their produce. The rest 47.53, 14.28, 1.53 .07 and 3.2 was used for household consumption, seed, wages in kind, animal feed and other purpose, respectively (CACC 2003).

$$MS = a + bP + e$$

Where
MS-   Marketed surplus of *Tef* per farm household
P-   Total production of *Tef* per farm household
b-   Portion of *tef* produce sold as marketed surplus
a-   Constant
e-   Error term

Table 2: Summary of statistical results of the linear regression

R square=056				
Analysis of variance				
	DF	**Sum of squares**	**Mean square**	
Regression	1	815.78424	815.78424	
Residuals	306	645.12689	2.10826	
Variables in the equations				
	b	**SE b**	**T**	**Sig T**
Quantity of tef produced	.355301	.018062	19.671	.0000
Constant	.068311	.135654	.504	.6149

3.1.3 Surplus production per Wereda

West *Shewa* is the major *tef* producing zone in the region given its agro ecological situation and the socio economics factors attached to *tef* in the study area. *Dendi* and *Adaberga* are among the major *tef* producing areas of West *Shewa*. In *Dendi* a total of 13,058.06 hectare of land allocated to *Tef* production. While in *Adaberga* a total of 8,069.64 hectare of crop land allocated to *tef* (CACC, 2003). The productivity of *tef* in the two *weredas* is 10.35 and 11.95 quintals per hectare, respectively. Taking market surplus calculated for *tef*, 35 percent, the market surplus obtained from *Dendi* estimated to be 47, 309.34 quintal while for *Adaberga* 33,748.59 quintal (Table 4).

Table 3: Marketed surplus per *weredas*

Weredas	Area Hectare	Yield qt /ha	Production Quintal	market surplus (Qt)
Dendi	13,058.06	10.35	135,169.56	47,309.34
Ada Berga	8,069.64	11.95	96,424.57	33,748.59

Source: CACC, and survey result

4. CHARACTERISTICS OF RURAL MARKETS

4.1 Market infrastructure

The focus group discussion (FGD) with traders helped researchers to characterize markets into different categories. During FGD markets divided into two, major and village markets. The major markets do have an outlet to Addis Ababa through the all weather roads it connects them. These major markets have easy access to transport facilities. With this criterion major markets were two in number in both *Weredas*. *Ginchi* and *Olonkomi* were major markets in Dendi which emerged with the development of the highway from Addis Ababa to Ambo. While *Inchini* and *Regi* in

Ada berga markets emerged with the establishment of *Mugar* cement factory (Table 9). All interviewed farmers requested how long they travel to reach the nearest major market and time traveled converted into distance with the assumption that on average a farmer can travel 6 km per hour. To reach the major markets farmers on average travel as far as 27 km (Table 4). Village markets, on the other hand, are located outside the highway and in most of the time supply marketable surplus to the closest major markets in the given *wereda*. FGD with farmers revealed that village markets established with the initiation from elder farmers who understood the benefit of having near markets. Farmers established village markets to get a market out let for their produce and to obtain consumable factory product when they are unable to visit major markets.

Table 4: The nearest major markets, and average distance traveled to reach major markets

Peasant associations	Major Markets	Average distance to reach major markets (km)	n	Standard deviation
Reji mekoda	Reji	5.3	74	4.36
Biye wogidi	Reji	12	54	3.74
Ilu mute	Reji	14	39	2.45
	Inchini	21	14	2.65
Oda dalota	Reji	27	26	2.53
Dano Ejerssa	Ginchi	5.4	49	1.90
	Wolonkomi	8.2	27	2.71
Wamura seqo	Ginchi	8.3	51	3.02
Wreqa werabu	Ginchi	12.6	48	4.91
Jewe Buri	Ginchi	14.5	46	2.25

Source: Survey result

4.2   Density of Rural Markets

In both study area there are a total of 22 markets, nine at *Dendi* and the rest in *Adaberga*. The total population in agricultural households estimated 206,917 in Dendi and 100,774 in Adaberga (CACC, 2003). This shows a single market on average serves for 22,990 and 7750 populations of the agricultural households in Dendi and Adaberga, respectively. In *Dendi*, there are two major markets and seven village markets (Figure 1). Whilst in *Adaberga*, there are two major markets and eleven village markets (Figure 2). These markets are evenly distributed in the study areas. In *Adaberga* in two markets; namely, *Wogidi* and *Danse*, barter trading reported as common practice. In these markets farmers exchange sugar cane with grain without

the need to have the medium of exchange, money. This indicates the stage of market development in the study area.

4.3   Market Place and Days

In the major markets traders did not have specifically located, designed and constructed market area for grain trade in general and *tef* market in particular. Most of the time traders' prefer to construct their collection point on different gets of the town. This has brought *tef* traders to be dispersed here and there throughout the town. In addition, during dry season much of *tef* traders establish temporal *tef* collection points outside the town. This was to get the chance of purchasing *tef* before the competitors. Traders reported they have serious problem during rainy season as most of their collection points are not accessible for lorries. The informal survey where collected during rainy season during which traders observed collecting *tef* produce on the main road from Addis Ababa to Ambo and Addis Ababa to Mugar, respectively. In a single day at *Olonkomi*, *Ginchi*, *Regi* and *Inchini* a total of 27, 36, 10 and 12 collectors observed purchasing *tef* from farmers, respectively. Traders at *Ginchi* visit *Olonkomi* *tef* market like traders at *Regi* visit *Inchini* and *vise versa*. *Tef* collection takes place in each marketing day within the time range of 10 am to 1 pm which is very short period for traders to accumulate much stock in a single marketing day. During FGD farmers consider to avoid overlapping of market days with nearest major markets so that to give mobile traders better opportunity to visit a number of village markets. This finding opposes what Teshome (2000) reported.
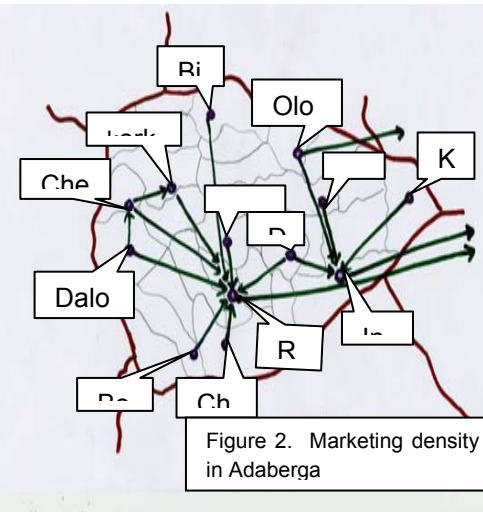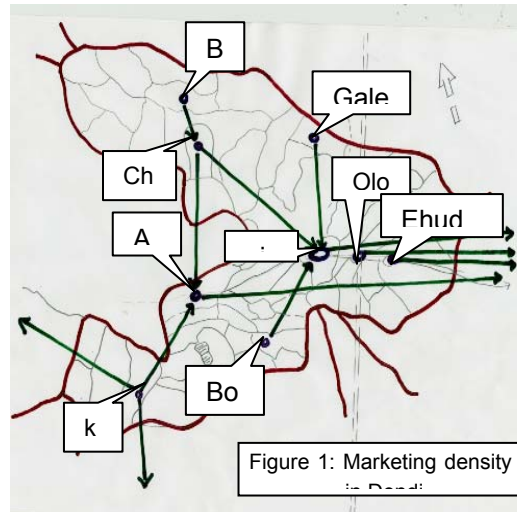
Figure 1: Marketing density in Dendi

Figure 2. Marketing density in Adaberga

Table 5: Marketing days and places in Dendi and Adaberga

Dendi				
No.	**Market places**	**Days of market**	**Specialization**	**Destination**
1	Ginchi	Thursday & Monday	Grain and Livestock	Addis Ababa
2	Olonkomi	Tuesday	Grain	Addis Ababa
3	Ehud Gebeya	Sunday	Grain	Addis Ababa
4	Kotoba	Saturday	Grain and Livestock	Dilela/ Ambo/Asgori
5	Chercher	Wednesday	Grain	Ginchi
		Saturday	Sheep	
6	Asgori	Sunday and Wednesday	Grain	Ginchi/ Addis Ababa
7	Galesa/ Qoftu	Sunday	Grain	Ginchi
8	Beke	Saturday	Grain/ Sheep	Chercher/ Ginchi
9	Boda	Monday	Grain/ Livestock	Ginchi/ Bussa
Ada berga				
No	**Market**	**Days of market**	**Specialization**	**Destination**
1	Regi	Saturday	Grain/ Livestock/ Vegetable	Addis Ababa
2	Inchini	Sunday	Grain/ Livestock/ Equines/ Vegetable	Addis Ababa
3	Olonkomi	Saturday	Grain/ Small ruminant	Ojeeduree/ Addis Ababa
4	Wegidi	Sunday	Grain/ Vegetable	Ojeeduree/Wegidi/ Addis Ababa
5	Kerkerecha	Sunday	Grain/ Small ruminant	Regi
6	Chekorssa	Saturday	Grain	Kerkerecha/Regi
7	Dalota	Thursday	Grain	Chekorssa/ Regi
8	Sumbetaguda/ Boro	Sunday	Grain	Regi
9	Sumbataguda/ Chancho	Thursday	Grain	Regi
10	Laga Robi	Wednesday	Grain/ Vegetable	Regi
11	Danse	Thursday	Grain/ Vegetable	Regi/ Inchini
12	Ijere	Saturday	Grain	Inchini
13	Kito	Saturday	Grain	Inchini

4.4. Storehouse facilities

Store facilities in the study area were in a very poor condition and most of them were with small capacity. *Tef* can be stored for longer periods without being attacked by weevils. It is also possible to store in any locally made storing materials. During FGD most traders reported unable to keep stock of *tef* as it needs huge amount of investment and working capital. Traders constrained not to make long-term

investment in the grain market, due to lack of loan from banks. However, in the absence of actual cost of storage, seasonal price differences could be compared with the opportunity cost of capital invested in inventories to serve as a rough indicator of storage efficiency (Gebremeskel et al. 1998). This percentage describes a gross return to storage (GRSR). The 16 years price data from Holetta grain market indicated, price starts to rise to cover storage costs over the period from April to August. The GRSR was estimated 15.8 percent over 5 months. Therefore, storage may be economically justifiable in this situation compared to 10 percent opportunity cost of capital per annum.

$$GRSR = \left(\frac{HigestGSI - LowestGSI}{LowestGSI} \right) * 100 = 15.8\%$$

Where:
GRSR= Gross return to storage
HighestGSI= Highest grand seasonal index
HighestGSI= Lowest grand seasonal index

4.5   Quantity Supplied

Farmers supply their *tef* produce in small quantities to the market. Concentration of *tef* arrival was a common phenomenon during the first quarter, December to February, of post harvest periods (Figure 3). FGD with farmers revealed that *tef* produce delivered to the market immediately after harvest for the main reason that to settle matured credit and land tax. The next important period when farmers need their cash requirement was during planting time in which significant number of farmers delivers their produce to the market to pay dawn payment for input credit and to purchase seeds. During household member get sick, married, and/or died are other important periods when farmers sold large portion of their *tef* produce to the market. In addition, farmers sell some of their *tef* produce to purchase low priced grain like maize which was to escape food shortage periods from July to December. Only in times when the quantity of *tef* available was not enough that farmers decide to sell out other capital assets like livestock's.

Fig 3. Periods when farmers supply tef to the market
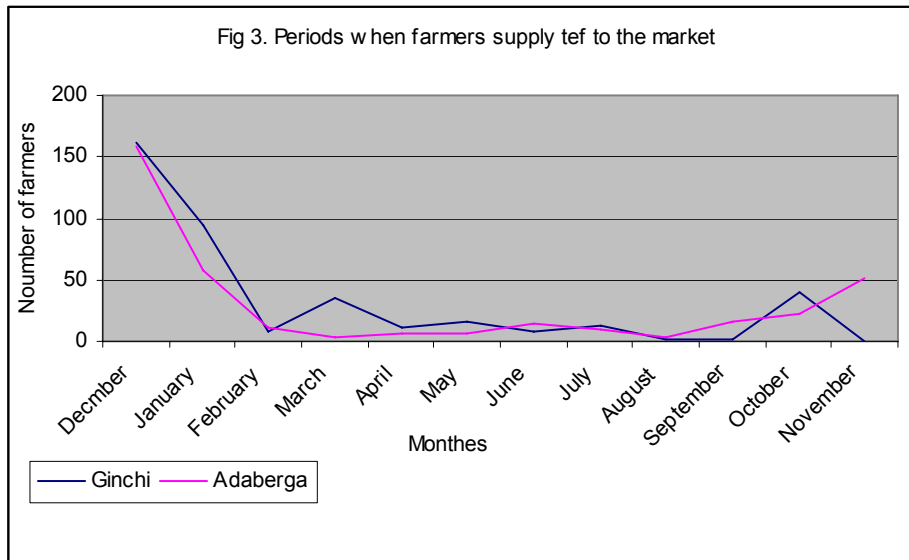
4.6.   Market Information

Most of the time traders visit Addis Ababa market two times a week to have information on grain price. A rural trader unable to visit the central grain market in Addis Ababa can get the information from his intimate friends participating in the grain market. This finding opposes that of Mulat (2003) in which he reported price information secrete among traders. Grain traders in the study area never used communication facilities like telephone. This might be due to undeveloped communication infrastructure coupled with the proxy of the study areas to central grain market. On the other hand, before delivering *tef* produce to the market farmers try to have information on the price level of *tef*. This price information can be obtained either by directly visiting major markets or by requesting price information from friends and/or relatives.

Buying and selling takes place through negotiations between farmers and assembler wholesalers in major markets. In the negotiation process, researchers have got a chance to observe knowledgeable farmers bargain for better price than others. However, in most of the cases traders were price givers taking the previous day Addis Ababa market price as a reference. Traders compete to purchase grain from farmers and use different incentives to attract sellers/ farmers. Of these mechanisms fixing better price level, and give one or two birr as a bonus for a person who delivered the produce were some of the incentives given to sellers. Differently, a firm observed in Regi while giving better quality seeds amounting 5 to 10 kg free of

charge to his long time customers at times of planting. Almost all interviewed traders and farmers anonymously reported that they never used weekly price information dispatched through radio broadcasts. Generation and dissemination of market information through Ethiopia radio and Radio *Fana* have been terminated due to lack of audience (Dawit, 2003).

5. MARKETING FUNCTIONS IN TEF

5.1. Bagging and Stitching

Tef is mainly produced by small scale farmers. Quantity supplied ranges from 5 to 500 kilo grams. Farmers use different locally available material to deliver their *Tef* grains to the market. Most of the time they use *silicha (locally made leather bag)* and *madaberia (plastic bag)* to supply *tef* produce to the market. Assembly wholesalers purchase *tef* produce from individual farmers and rural assemblers in the major markets. Platform scale used to weight *tef* supplied by individual farmers. These assembly wholesalers used 100 kg bags locally called *madaberia* to pack and transport it to the central market. All produces were packed in a similar packing material. However, there is no effort made to identify deferent types or grades of *tef* produce with the help of bagging material which would have invite distant marketing.

5.2. Tef Grades

Assembly wholesalers in the major markets divide *tef* produce into five, namely; *magna (very white), nech (white), sergegna (mix between white and red), abolse* and *key (*brown*).* Four of the grades indicate the color of the *tef* variety. The remaining, *abolse*, was the name given to the improved *tef* variety in the study area. The market gives high value for *magna* while *key* is the least valued. Traders reported through time the demand for *abolse* was increasing. Consumers' experimented *abolse*, preferred it for its baking quality. However, the market value was lower than other verities. This was due to its unattractive deem color and smaller size of the seed. In both study areas most traders purchase *tef* produce dividing into three; namely, *nech*, *sergegna* and *key*. Every collector has three canvases and a weighting balance to buy *tef* produce from farmers or rural traders. Purchased *tef* produce from farmers and rural assemblers added up in one of the three canvases looking into its color. Each marketing day purchased *tef* mixed up in the given canvas to have similar color before bagging in 100 kg lots. Primal wholesalers reported that the reason why they mix up *tef* produce was to qualify products to have similar color that was impossible otherwise due to the small quantity of *tef* supply coming from small scale producers. During FGD traders able to estimate proportion of *tef* supplied to *Inchini* and *Regi*

market. In Dendi market *magna/ nech*, *sergegna*, *key* and *abolse* supplied in higher quantity in order of quantity supplied while in Regi market *magna/ nech*, *abolse*, *key* and *sergegna* were in higher proportion (Figure 4 and 5).

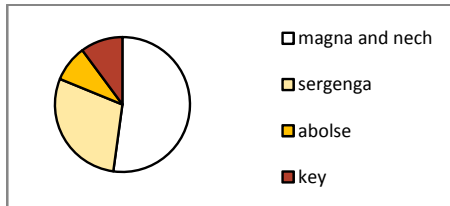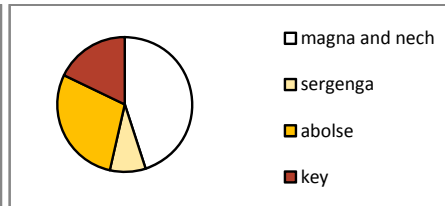**Figure 4: Type of produce supplied to Ginchi market**

- magna and nech
- sergenga
- abolse
- key

Figure 5: Type of produce supplied to Regi market

- magna and nech
- sergenga
- abolse
- key

Quality and standard authority of Ethiopia is sole governmental organization deal with setting of standards for products. Availability of standards encourages distance marketing between traders and consumers. According to Quality and Standards Authority of Ethiopia (QSAE), *tef* has classified into four; namely, very white (*magna*)/ include 98-100% very white *tef* grains/, white (*Nech*)/ include 95-98% or more white *tef* grains/, Brown (*Key*)/ 94-100 of brown *tef* grains/, and mixed (*sergegna*)/ include mixture of white and brown *tef* grain in a greater or in lesser proportion of the above classes (Table 6).

Table 6: *Tef* grade

Classes	Characteristics	Maximum limits of impurities in %			
		First grade	Second grade	Third grade	Fourth grade
Very white	Foreign matter	1.5	2.5	3.5	5.0
	stone	0.6	0.6	0.6	0.6
White	foreign matter	1.5	2.5	3.5	5.0
	stone	0.6	0.6	0.6	0.6
Brown	foreign matter	1.5	2.5	3.5	5.0
	stone	0.6	0.6	0.6	0.6
Mixed	foreign matter	1.5	2.5	3.5	5.0
	stone	0.6	0.6	0.6	0.6

Source: Ethiopian standard

Storage

Most farmers sell much of their produce immediately after harvest. Some quantities will be kept to be sold at times they need cash. Farmers used traditional storage mainly locally made leather bags (*silicha*) and sacks of different types and size.

Assembly wholesalers also store their produce for short periods of time until the *tef* is transported to the central grain market. Most of *tef* is stored after bagged in 100 kg lots. These assembler wholesalers reported due to working capital shortage and limited storing capacity almost all *tef* produce transported to central grain market once enough quantity was purchased. Weredas' bureau of Finance, Plan and Economy registered about 55 and 20 firms in Dendi and Adaberga, respectively, participating in a grain market at different capacity (Table 7).

Table 7: Number of firms registered in grain marketing

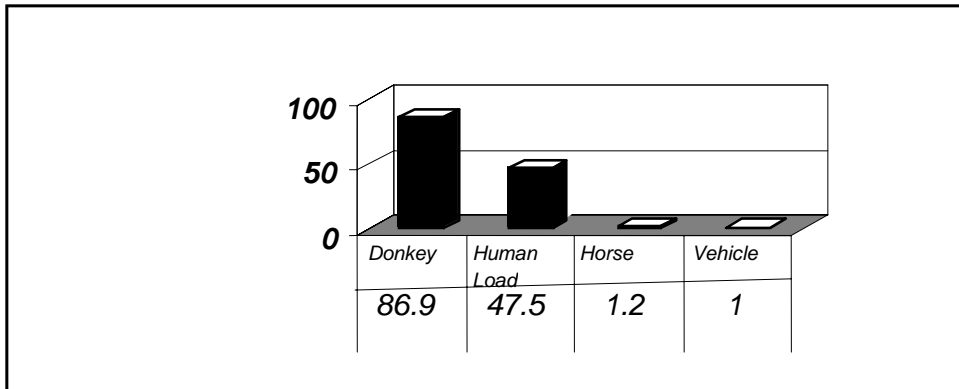| Capital position	Number of traders	
	Dendi	Adaberga
Less than 10,000	3	5
10,000- 15,000	20	3
15,000- 20,000	17	4
20,000- 25,000	7	3
25,000- 30,000	6	2
30,000- 35,000	2	3

Source: Finance, Plan and Economy

Transportation

Transportation facility is the important marketing function which make producer in surplus producing areas gain better market price while consumers in deficit areas get reduced marketing price than would have been prevailing otherwise. Due to poor infrastructure, most farmers in the study area use donkeys, human load, horse, and vehicle to transport their produce to the nearest village or major markets (Figure 6).

Assembly wholesalers, on the other hand, use lorry to transport purchased *tef* produce. During transportation a group of small scale traders may use a single lorry. At the time of loading, bagged *tef* will be given an identification label of each trader. The traders do not need to move with lorries as transporters take the responsibility of carrying different firms' grain to central markets. There are cases in which a trader contracts a lorry alone when the amount of *tef* to be transported sufficient enough to the capacity of the lorry.

Figure 6: Type of Transport

	Donkey	Human Load	Horse	Vehicle
	86.9	47.5	1.2	1

(Bar chart with y-axis values 0, 50, 100 showing Donkey highest, Human Load next, Horse and Vehicle very low)

Market participants

Producers

Producers are the single important part of the marketing structure without whom all other marketing practices is impossible. Producers commence providing *tef* produce since end of December. In the study area, *tef* is among main cash crop used for the purpose of income generation. Producers near the major markets supply their produce in these markets. Those producers far away from major markets might supply to rural assemblers or carry their produce to the major markets. Transaction within village takes place when the farmer is too busy with farm activity, unable to visit far markets due to health problem, the produce to be supplied is too small and/ or if he lacks equines to transport the produce.

Rural assemblers

These can be considered business oriented farmers. Most of rural assemblers have at least primary level education and are accustomed to visit the nearby towns repeatedly. Rural assemblers reported use equines as transport facilities; working capital and price information are power for them to be successful. Rural assemblers serve as suppliers for both major and village markets in their round trip. Agricultural products from rural areas supplied to major markets while they supply factory products such as salt, kerosene, soap, sugar, coffee and etc to village markets.

Assembly wholesalers

These are traders who collect *tef* from both farmers and rural assemblers. Moreover, grading and packing will takes place at this stage by assembly wholesalers. *Tef* grain will be packed in hundred kilo grams to transport it to the terminal market in Addis Ababa. These wholesalers need to have a working capital, weighing balance, canvas,

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negotiating skill in local language, knowledge of different varieties of *tef*, price information, etc. These wholesalers were responsible to facilitate transportation of *tef* produces to the terminal market by themselves. Assembly wholesalers who reached to terminal market sale *tef* produce either to wholesalers or directly to consumers through the help of brokers. If the whole *tef* produce was not marketed in a single date, it might be given to millers and other customers in Addis Ababa in a form of credit. This was usually done to reduce storage costs and when the price was below expectation.

Brokers in rural market

Most of assembly wholesalers in major markets have their own brokers. The function of these brokers was agitating farmers to sale the produce to the given assembly wholesalers. The researchers observed when brokers forcing peasant farmers to sale their produce to the given assembler. According to assembly wholesalers they chose brokers who are talkative and able to convince farmers to sale the produce. These brokers might work the bagging and stitching in addition to the brokerage service they are providing.

Analysis of tef price formation

Spatial integration

Spatial integration is the tendency of co-movement of price located in different markets. The proper allocation of incomes to market participants can be judged through calculating price correlation coefficients for different markets (Fafchamps, 1995). If market participants receive payments equivalent to their role, the correlation coefficient approaches 1. Correlation coefficient was calculated using price data obtained from three districts; namely, *Dendi, Adaberga and Welmera.* The price information obtained was from 1999 through 2003. The result showed that price in any given pair of markets move together i.e. correlation coefficients is more than 75 percent for all cases (Table 8). As all markets are near to Addis Ababa, the central grain market might influenced *tef* market prices to move together.

Table 8: Simple correlation coefficients of pairs of *tef* market prices in West Shewa, 1999-2003

| Pairs	n	Simple correlation coefficient (r)
White *tef* at Holetta Vs Inchini markets	45	0.861***
White tef at Holetta Vs Ginchi markets	45	0.851***
White *tef* at Ginchi Vs Inchini markets	45	0.767***
Mixed *tef* at Holetta Vs Inchini markets	45	0.942***
Mixed *tef* at Holetta Vs Ginchi markets	45	0.828***
Mixed *tef* at Ginchi Vs Inchini markets	45	0.818***

*** Significant at p<1

Seasonality of tef price

Statistical analysis of seasonality was made on *Tef* price obtained from *Holetta* agricultural research center. The price information covers the period 1987 to 2002. A 12- month moving average was applied to the monthly price data of sixteen years. To reach the seasonal index; trend, and cyclical component of the price were isolated. The analysis indicated that August was with highest Seasonal Price Index (SPI) while March was with lowest SPI (Table 9 and Figure 7).

Table 9: Analysis of seasonal trends in retail *tef* price 1988-2001

Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1988	97.08	95.16	92.27	91.50	94.87	110.26	108.57	113.18	113.55	103.76	104.31	93.87
1989	89.48	93.12	93.66	99.26	94.84	98.91	101.93	101.69	98.81	97.00	103.24	107.61
1990	106.79	105.52	85.70	91.11	91.89	102.73	102.38	102.07	103.58	103.41	103.40	93.68
1991	88.13	86.36	93.98	94.93	102.00	107.50	111.32	112.05	105.12	101.45	105.92	96.67
1992	96.57	99.21	97.55	95.11	98.79	99.68	100.30	104.14	107.07	109.10	109.20	101.95
1993	95.81	96.04	89.88	91.01	98.40	99.21	100.38	104.64	99.81	101.82	100.10	92.56
1994	88.09	87.26	86.97	88.04	110.18	115.10	112.86	110.29	109.61	106.50	101.98	92.59
1995	91.51	95.24	96.44	101.18	101.10	100.41	101.82	103.89	106.93	102.77	107.31	100.55
1996	99.17	93.49	93.73	90.52	104.55	95.70	109.09	107.13	105.25	113.62	92.04	95.22
1997	88.04	87.75	83.42	88.72	99.24	106.43	107.09	106.28	119.09	111.62	102.17	89.39
1998	93.44	90.32	89.46	86.09	104.68	106.78	107.50	110.19	105.92	107.64	98.94	88.31
1999	85.86	92.79	93.15	94.18	104.85	115.94	110.50	107.53	110.70	104.76	100.30	84.77
2000	89.36	97.00	99.09	101.75	104.37	107.35	102.97	105.65	99.34	105.87	106.93	91.82
2001	101.39	104.59	93.36	89.17	99.76	90.25	90.76	103.52	101.69	101.27	103.25	103.71
GSI	93.73	94.67	92.16	93.15	100.80	104.14	104.94	106.72	106.30	105.17	102.91	95.31
Std. Error	1.63	1.56	1.20	1.31	1.31	1.94	1.57	0.98	1.53	1.18	1.14	1.69
Std Dev	6.09	5.83	4.50	4.91	4.89	7.24	5.87	3.65	5.72	4.43	4.26	6.34
t-test values	-3.85	-3.42	-6.52	-5.22	0.61	2.14	3.15	6.89	4.12	4.37	2.56	-2.77

The standard deviations measure the usual level of uncertainty for a given month (Tschirley, 1995). This is indicated with the dashed lines on Figure 7 which represent plus and minus the standard deviation around the average, and are the indicator of degree of price variability. The standard deviation is lowest during August and March through May. This means in August almost certainly the supply of *tef* was too small to satisfy the demand making price highest of all months. Immediately after trashing March through May market's uncertainty was at its minimum as the information on the market situation was easily available. The standard deviation is at its peak before harvesting and trashing (December and January) and planting (June and July). Market participants during the period before harvest lack complete and reliable information on supply and demand condition of the forthcoming months. In June the uncertainty emanated from two sources. Primarily, farmers look for cash to pay down payment for fertilizer credit. Secondly, farmers purchase *tef* for the purpose of seed. Eventually, to get these amounts of money farmers' supply their *tef* produce to the market. However, traders from experience learned that there is always more quantity of *tef* supplied during June and July. However, supplied quantities not known with certainty making the standard deviation high. Calculated t value indicated all except two months (May and June) showed significant difference from 100. Hence, in west Shewa, *tef* price seasonality exists.

Figure 7. Seasonality of White tef price in West shewa zone
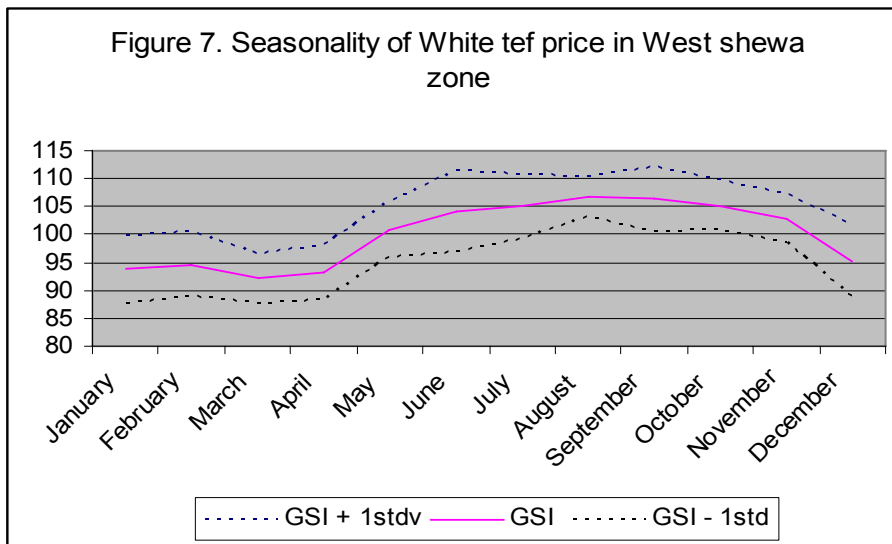
Tef Marketing pitfalls

Malpractices

In major markets, during *tef* selling and buying process a variety of prices observed in the same day at the same time and in the same market. The FGD with traders revealed that those traders who give relatively better price to farmers con farmers with the help of incorrect weighting balance. This can be considered among the different malpractices performed by traders. Adulteration was another common malpractice accomplished by both farmers and traders in *tef* marketing. Farmers knowingly or unknowingly do not clean their produce to the best of their capacity. Those who do it knowingly are to get the weight advantage. It was also reported that traders combine white *tef* with sand while red *tef* mixed up with red clay soils. Traders also mix up what they consider poor quality *tef* with that of the best quality to get the price advantage of the better quality.

Lack of product standardization

The grain market in general and *tef* market in particular suffers from lack of product standardization. This has a bad connotation on distance market. The advantage of distance market would have helped in reducing marketing cost. To improve product standardization, it is necessary to give education to all stakeholders involved in *tef* marketing.

Lack of Credit facility

The limited access to formal credit reported the major bottle neck of the grain marketing as a whole. The information obtained from development bank of Ethiopia indicate that in the past 12 years only a total of 27 traders get credit service in west *Shewa* zone for the purpose grain marketing. The loan request for grain market was still continued from traders' side. Yet, the Bank was unable to respond for the requests. This was because number of defaulters increased in the study area. During the data collection time, the bank officials reported 80 percent of extended credit was not repaid by the defaulters. According to the bank officials, even though different feasibility studies conducted by the bank showed that the grain market was a profitable business in the two study areas, yet funds borrowed in the name of grain marketing mostly diverted to other purpose (to build house and for consumption purpose).

As a rule, the bank will not provide additional loan for a given area unless 50 percent of matured credit repaid back. Indeed, specifically the bank no more interested to provide additional credit in *Ada berga* for grain marketing, as most of the clients in that area were defaulters. During the data collection, it was reported only 6 traders in

Adaberga and 1 trader in Dendi took credit ranging 38,000 to 300,000 birr (personal communication of development bank of Ethiopia, Ambo branch).

6. CONCLUSION AND RECOMMENDATION

- The study areas have undeveloped market infrastructures. Specifically in major markets traders do not have specifically located, designed and constructed marketing place for grain trade in general and *tef* market in particular. Most collection and selling points of traders were scattered throughout the towns which don't favor competition among traders. Moreover, it also creates inconvenience for urban consumers visiting the given major markets and government line departments responsible for revenue collection and administration. Therefore, in the respective towns attention should be given for development of marketing infrastructure.

- Both farmers and traders have little knowledge on marketing concepts. Hence, it is important to set market extension body under the umbrella of the extension system. The main function of marketing extension is to lay down an advisory body for farmers and traders about the benefit that would be obtained from improved marketing system. This market extension can be supported by public Medias to aware farmers, and traders to improve grain marketing system of the country. The market extension may teach farmers the need to provide quality produce without adulteration while traders try to make standardize the produce through packing and labeling.

- Even though there is a standard set for *tef,* traders and farmers are not aware of these standards. There is no effort made so far to make *tef* produce standardized from suppliers' side. For standard product labeling is a prerequisite and suppliers have to know among others, name of varieties, type of soils in which the produce is grown, and color of the produce. In central grain market quality of *tef* judged based on the production area and color of tef produce. Therefore, during bagging and stitching it is important to start to label at least where it is produced and if different bag color used to identify different grades of *tef* will enables to start distant marketing in Ethiopia. Distance marketing is a type of transaction in which without purchasers need to avail themselves in the spot market able to order the quality and quantity of *tef*.

- Farmers in the study area have a long period complaint about grain price fluctuation. Therefore, the seasonal price pattern can be used to advice producers in the study area when should be the time deadline for selling large portion of their crop. Those times of the year when prices are usually the highest can be used as a reasonable time for farmers to sell large percentage of the crop. Moreover, the study showed that there was seasonality in *tef*

marketing justifying the need to store *tef*. Construction of warehouse and storage facility would be feasible for private investors in the study area.

- Limited number of traders' borrowed very small amount of credit from banks. Most traders also failed to repay matured credit on time. This was because; traders divert the income coming from grain markets to consumption and/ or other poor performing business. Increment in the number of defaulters, forced banks to require strong guarantee. On the others hand, shortage of capital prohibited newly emerging traders not to make long-term investment in the grain market. There were cases when these traders lack working capital. Even those able to provide the collateral were afraid to borrow from banks. Hence, banks operating in the study area should have to revisit their rule and regulation to provide working and long term investment capital to support strength the grain marketing.

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