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1 Introduction to the meat sector

Livestock production is generally a small-scale activity carried out as a part of a mixed farming operation. Only 2.4 % of the holdings are involved exclusively in animal husbandry. 67 % of holdings carry out livestock activities along with crop production. The land and livestock owned are also distributed unequally. Small farmers (20 ha) own 21.3% of the land, 50% of the sheep and goat and 49% of the cattle. The larger farmers (> 80 ha) own 14.5% of the sheep and goat and 10.1% of the cattle (TURKSTAT, 2001; MARA, 2006). The number of cattle per farm decreased from 4.6 in 1990 and 3.4 in 2005. The number of small ruminants per farm decreased from 42.1 in 1990 to 15.3 in 2005 (TURKSTAT, 2005).

The livestock sector is an important part of the agricultural sector and has a high potential in the economy. The livestock products, including meat, milk, eggs, honey, wool, hides and skins, play a significant role in the Turkish economy. The meat sector provides employment for slaughter, marketing and processing. Livestock gives increased economic stability to farm household, acting as a cash buffer (small stock), a capital reserve (large animals) and a hedge against inflation. In a mixed farming system, livestock reduces the risk through diversification of production and income sources (Anonymous, 2006).

Animal husbandry constituted approximately 25 % of total 38 billion USD (10 % of GDP) agricultural production value in 2005 (TURKSTAT, 2006). The sector's contribution to farm income is substantial, livestock products are traditionally an important source of household income for many farmers and activities related to livestock production and marketing are important to the economic development of rural areas in Turkey.

Turkey produces beef, sheep, goat, buffalo, camel, pig, and poultry meat. However, only beef, meat from small ruminants, and poultry meat are economically important. The value of the meat in the total livestock products' value is around 40 % (TURKSTAT, 2005).

High tariff rates prevent import of meat and meat products into Turkey. As a result Turkey is considered to be a self-sufficient country in meat production. However, self sufficiency in poultry meat production is a bit above 100 %. Turkey used to be more than self-sufficient in lamb meat and goat meat. Self-sufficiency rate has decreased to 100 % in 2005.

2 Structure of the sector and recent evolutions

During the last decades, Turkey's livestock sector has displayed two clear trends: declining the number of livestock; and increasing meat production due to the rapidly growing poultry sector.

Several factors, over the past two decades, have influenced the continuous decline in Turkish sheep and goat herd, which is forecast to continue declining through 2010, despite improved market for sheep and goat meat. The first of these is the nature of Turkish production, which is small-scale and heavily reliant of domestic breeds, which although better adapted to the harsh climate of Eastern Turkey, are less productive than western breeds.

Beef and veal production decreased from about 360000 tonnes in 2000 to 320000 tonnes in 2005. Sheep and goat meat production decreased from about 132000 tonnes in 2000 to 86000 tonnes in 2005. This fall in red meat production has been complemented by rising poultry production.

However, the Ministry of Agricultural and Rural Affairs (MARA) calculates the red meat production on the basis of livestock populations higher than those that TURKSTAT reports which is more accurate. Thus, red meat consumption per capita may be as much as twice as high in 2006.

Major production increases have occurred in the output of the poultry sector, which is concentrated in the western provinces and near urban centres. The output of poultry meat has grown at an annual rate of 2 % since 1990. The growth in production of the poultry industry has been due to major efficiency gains in production, based on foreign genetics and equipment. Unlike the other sub-sectors poultry has developed into a fairly modern industry which meets international standards in production technology and processing. The total production increased from about 660000 tonnes in 2000 to 980000 tonnes in 2005.

Apart from backyard poultry, which has a 30 % market share, the poultry sector is dominated by vertically integrated producers that contract with larger firms or supermarkets. There are about 6,200 broiler producers with less than 10,000 places per cycle. These small- and medium-size producers have market shares respectively of 70 % of egg production and about 90 % of the broiler production.

The Turkish Development Foundation (TKV) has played an important role in the start-up of medium-size poultry producers. TKV's poultry program during the late 1980s and early 1990s helped farmers: to establish small poultry farms (capacity of 4,000 broilers/cycle); to set up local and regional cooperatives; to obtain inputs, such as feed, day-old chicks and medication; to market their output (through TKV's Köy-Tür marketing branch). (WB, 2000), Recently, a number of new players have entered the market (Mudurnu, Önder, Banvit, Lades, etc.), companies often associated with supermarket chains.

The total number of beef fattening farms in 2001 was 71,216 with a total number of 1,172,753 heads (TURKSTAT, 2001). Thus, only 2% of all holdings (71,216 out of 3,075,515) are specialised fattening enterprises, yet they contain 9.5% of the total cattle population.

Furthermore, the breakdown of the size of the specialised fattening holdings shows a very unequal distribution of animals; just 1.2% of the fattening holdings (those having 150 or more animals) keep 43% of all fattening animals, whereas at the other end of the scale 68% of fattening holdings (those having less than 10 animals) keep only 19% of the total fattening animals. Thus it can be seen that the beef fattening industry is dominated by a very few medium and large-scale producers. The 623 largest holdings (under 1% of the total) have an average of 722 animals each and account for about 30 % of the fattening animals.

The average carcass-weight of cattle and small-ruminants has increased in recent years. The increases in carcass weight in cattle and small ruminants resulted from improved genetics (principally in cattle), feeding techniques and available feed. Carcass data for cattle indicates that a substantial growth in yield has taken place. The average carcass weight of cattle has increased from 176.7 kg in 1997-99 to 200 kg in 2005. The average lamb carcass yield has increased from 14.9 kg in 1998 to 19 kg in 2005 (TURKSTAT, 2006; MARA, 2006).

Most of the meat plants are mixed plants for bovine animals and small ruminants. The total number of meat plants is 665 divided into public and private organizations. Private enterprises

usually include a slaughterhouse, a cold storage and meat cutting/processing plant. Meat plants are divided into 3 categories (Anonymous, 2005):

Class 1: >40 bovine per day and cold storage facility (33% of the total, mostly private),

Class 2: from 21 to 40 bovine per day; (4% of the total number mostly public),

Class 3: <20 Bovine per day; (63% of the total number, mostly public).

Public meat plants (only slaughtering process) are used for 15-20% of the total slaughtering. Private meat plants are processing 75-80% of the animals.

Private Class 1 Meat Plants (10% of the total number of meat plants) have been established based on EU standards in terms of lay out but not in terms of production process managed properly (technically, hygiene and financially). These meat plants include slaughtering, cold storage, meat cutting and meat processing. The quality assurance for the large-scale domestic supermarket chains provides incentives for the large meat processing plant in terms of packaging.

Live animals are transported by road and rail from producer areas to local and central markets. The loss in weight is quite high in both ways of transportation. Meat carcass and meat products originated from Class 1 Meat plants are generally transported by trucks which are equipped with cooling systems.

Meat and meat products' prices are formed completely in a free market condition. State interference on this industry has been abolished after the start of privatisation of State Meat Plants.

3 Policy and standards

The Turkish livestock sector has been state supported ever since the establishment of the Republic of Turkey in 1923. However, government involvement in the market increased during the planned period begun in 1963. There is no specific support scheme for beef, sheep and goat farmers. However, under the Livestock Support Scheme, the decree issued in 2000, there are programmes that cover the following:

- Animal husbandry improvement support: Subsidies paid for animal with breeding certificates.
- Fodder crop support: Investment and operating costs of project covering perennial fodder crops (clover, sainfoin) excluding transport and pesticides; investment and operating costs of projects covering annual crops (vetch, silage maize and sorghum) excluding transport and pesticides.
- Animal health, identification and registration: Support farm free of diseases; vaccination and stamping out; livestock registration.
- Protection of animal genetic resources.
- Import restrictions or control on meat and meat products, dairy products, livestock, and animal feed resources,
- Improvement aid and artificial insemination applications

With the decree, the government announces the direct payments, subsidies in cash. Government has encouraged dairy farming by giving direct payments. The government also promoted the farming of fodder crops for dairy/beef farming. In the last six years, direct subsidies financed

from the budget were given to dairy/beef farmers. Low interest credits are given for investment and operation purposes and are given both to companies and individuals. The lines of subsidised credit or the activities to be subsidised are jointly decided by the respective Bank and MARA.

The Turkish Standards Institute produced a standard for beef and sheep carcass classification (TS 668 Nov 1986) The standard includes carcass type, conformation, fat cover and length. The standard divides young bull and heifer carcasses into 4 classes (Extra, 1st, 2nd and 3rd class) and divides cattle, steer and bull carcasses into 3 classes (1st, 2nd and 3rd class). These standards do not relate to the EUROPA system of carcass classification in EU.

4 Market trend and perspective for meat consumption

Approximately 40% of small ruminants are fattened and slaughtered specially for the annual Festival of Sacrifice. It has to be noted that unregistered red meat production is considered to be significant but cannot be accurately estimated. In contrast to red meat production, there has been a rapid growth in poultry meat production, so that total red and white meat production has increased.

Per capita consumption of animal products has been stable. However, it varies among beef and veal, sheep meat and goat meat, and poultry meat. Per capita consumption of beef and veal decreased from 5.3 kg in 2006 to 4.5 kg in 2005. Likewise, per capita consumption of sheep and goat meat decreased from 1.9 kg in 2000 to 1.2 kg in 2005. The decline in red meat consumption was offset by an increase in the poultry meat consumption. Poultry meat consumption increased from 9.64 kg in 2000 to 12.94 in 2005, due both to health reason and price factor.

Rapid growth in population, urbanisation and real per capita income has led to a faster expansion of food demand than agricultural production, resulting in a shift in consumption patterns towards other animal products (poultry and fish). Per capita consumption of red meat has decreased over the last decade. Imports have not been available to fill the gap in demand due to high import duties designed to protect the domestic production. Meat consumption has shifted over time from beef, veal, lamb, and goat to greater consumption of poultry and fish due to the rising cost to the consumers, changing tastes, production costs and availability.

Turkey is now in a phase of rapid economic growth and increasing incomes, particularly in urban areas, and it can therefore be predicted that demand for animal products will increase in terms of quantity, quality and variety. Once Turkey opens its borders as part of the EU Accession process, this latent demand will be met by imported animal products unless the livestock sector shows a strong and rapid response to increase production, quality and the range of products on offer (WB, 2000).

The largest player had been the State, which operated trading systems, abattoirs, meat transport, etc., largely through state-managed trading/processing organisations, i.e. the Meat and Fish Agency (EBK). The government has made progress in withdrawing itself from the market with the privatisation and/or sale of various meat and milk processing facilities. Most of the slaughterhouses belonging to the Meat and Fish Agency have been privatised. The role of the private sector therefore has increased to a large extent.

Live animals are sold in local markets, and central livestock exchange markets by farmers and traders. There are different ways of selling (by animal, live weight, net carcass weight). The

animals raised by the farmers go directly to traders, intermediaries and/or to unlicensed slaughtering sites. The animals collected by wholesale butchers go to the municipal slaughterhouses, to private slaughterhouses and then to the meat processing plants, to the retail markets and to the consumers (Annex Figure 1).

By 2010, animal products are expected to contribute proportionally more to food supply in Turkey than they do at present. During the next 10 years, rates of meat consumption will increase due to increasing demand. This will be supplied by domestic production and imports once the market is opened.

5 Recent evolution and perspectives for trade

Official data on external meat trade shows an absence of red meat export to the EU due to outbreaks of foot and mouth disease (FMD) in the country. The export of livestock or red meat products from Turkey cannot be considered until FMD is eradicated and under control.

Turkey maintains high tariff rates on some food and agricultural products to protect domestic producers. Red meat imports have been negligible in recent years despite unsatisfied demand within the country.

In the last six years, the highest import of live cattle, as carcass weight, was 797 tonnes in 2000. In some years there were no imports at all. Red meat imports no more than 40 tonnes. Exports of live cattle were also negligible. However, exports of live small ruminants amounted to 1000 tonnes as carcass weight equivalent in 2000.

Turkey showed a considerable increase in export of poultry meat. It was 10500 tonnes in 2000. That increased to about 46000 tonnes in 2005. Since 2000, Turkey's imports of poultry meat have been negligible though there have been some imports of live poultry for breeding purposes.

6 Expert views on the success and challenges of the sector

Driven by the investments of major capital groups and private entrepreneurs, efficient agricultural enterprises are flourishing, whilst the food industry is starting to sponsor contract farming and to invest directly in modern livestock farms. These developments may be exploiting the favourable subsidy climate designed for small producers. They are likely to become an increasingly dominant part of the industry. The 623 largest beef fattening farms have a capacity of some 450,000 head, which represents in the range of 15-25% of the annual slaughtering. However, it seems that profit margins are thin and depend on the support, even on large-scale units.

Key problems of the sector are the unavailability of raw material, lack of accurate least-cost ration formulation to determine the most cost-effective feeding systems, low level of traceability of the compound feed, lack of laboratory equipment for feed analysis at border points and ports, and animal protein still incorporated in compound feed for non-ruminants.

The development of successful intensive beef fattening operations will depend very much on the feeding costs for each kg of live weight gain and the differential between cattle purchase and sale prices.

In 2001, MARA Directorate General of Protection and Control established a computerised national database for cattle Identification and Registration (I&R). The Provincial Directorates of MARA are in charge of the operation. The I&R system is in line with the EU requirements. The cattle I&R and movement control system is a precondition to every animal disease control and eradication programme as well as food safety issues. The system shall be implemented for the cattle population in all Turkey prior to extend the system to sheep and goats in 2008. The current system i) allows a full traceability of animals and transparency of the life history, ii) protects the illegal animal movements from outside and inside the country and iii) enables to control the progress of vaccination (MARA, 2006).

40 % of the population live in rural areas and mostly depend on their own production for red meat consumption. It is estimated that 40% of the livestock slaughtering in Turkey is not registered (in slaughterhouses, in farms, in butcher shops). The annual Festival of Sacrifice, which is not controlled by Public Health authorities, involves 40% of sheep (1 million) being slaughtered in two to three days. The capacity of the slaughterhouses is too small for this volume of slaughter so temporary premises are organised in large cities.

Low efficiency and low economic profitability of the meat production sector is a challenge. In addition, poor technology both in primary red meat production and the meat processing sector, which leads to low product quality and difficulties in meeting EU standards related to the environment, hygiene and animal welfare are main obstacles in the sector.

Priorities in the EU negotiation process related to the red meat sector are Alignment to the Veterinary Acquis; Alignment to the Phytosanitary Acquis and Establishment of the Necessary Institutional Capacity; Food Safety and Control; Adoption of the Legal Basis, Administrative Structures and Implementation Mechanisms for the Establishment of Common Market Organisations and Effective Monitoring of Agricultural Markets.

Fodder crop planting has increased and a new pasture management was adopted. Most animals are fed with a high content of straw in the diet, which restricts growth rates. Animal welfare conditions are primitive and unhealthy in traditional barns. The cattle breeds, mainly indigenous, Holstein and some Brown Swiss, are not appropriate for high quality beef production. The small-scale farmer does not have the knowledge or resources to increase production in response to growing demand for red meat.

Turkey needs to take measures on the market, trade and movement control and FMD in neighbouring countries. Animals from Eastern and South Eastern provinces are traded continuously to Western provinces. The biggest markets are in the west of Turkey. It will not be possible (or desirable) in the short term to cut off these trading habits. Licensing of animal transport vehicles and registration of animal dealers need to be solved as well as effective movement control. FMD continues to be endemic in Turkey's Eastern neighbouring countries and depending on the market prices of meat illegal movements may occur. Therefore control of FMD in these countries is essential for the sustainability of the FMD control programmes in Turkey. Cooperation between Turkey and its neighbours for the control of animal diseases is of importance.

7 Conclusion

Small-scale livestock producers are uneconomic and not responsive to subsidies. The subsidy environment has been very encouraging for large-scale livestock sector businesses. Driven by the investments of major capital groups, efficient large-scale agricultural enterprises are flourishing, while supermarket chains and the food industry are starting to sponsor contract farming and to invest directly in modern livestock farms. As the quality and safety problems are solved, integration and mergers between the red meat production sector and meat processing plants is expected to increase and the sector could achieve rapid growth.

In order for small/medium scale operators to develop, the following steps are recommended:

- Physical infrastructure should be developed in rural areas where necessary,
- Encourage setting up specialist beef breeding farms,
- Improved sheep production should be encouraged through cross-breeding,
- Livestock fattening farms (feed lots) should be modernised to establish competitiveness and sustainability, quality of meat products should be improved as well.

There are currently no cross compliance rules in Turkey such as those required under the CAP. A significant part of the agricultural *acquis* concerns sanitary and phyto-sanitary measures, animal welfare, hygiene standards and food safety. Turkey has already made a good start with passing necessary legislation. However, there remain several issues in the implementation of these regulations (Oksam et al, 2004). Creation of an infrastructure to manage the *acquis* is a longer and difficult process. More difficult still is the fact that the sector is highly fragmented, with a substantial share of output going through informal markets or consumed on farm. Therefore, effective communication of the SPS *acquis* to producers, as well as monitoring and control of all the regulations will be a difficult and daunting task, primarily because of the large number of small farmers.

In addition, Turkey has to strengthen existing programmes for disease eradication and control. Turkey also has to adopt a strong and proactive programme where necessary. These programmes have to be implemented with increased border controls on illegal animal movements. Turkey will seek technical and/or financial support from the EU to strengthen these programmes and border control which would be of benefit to Turkish producers and consumers alike. Otherwise, adapting the *acquis* would make farming more difficult in such a production environment and most of the farms go out of the business, leaving only semi-subsistent farms having no commercial role to continue in production.

Opportunities for the Turkish livestock sector can be summarised as follows:

1. EU negotiation process could be a driving force for the food safety, border measures, and animal health,
2. Relatively high number of livestock,
3. Potential for organic farming
4. Increasing demand for animal products.

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Annex 1: Country profile for beef and veal

tonnes	2000	2001	2002	2003	2004	2005
Gross indigenous production	358,691	333,893	329,277	292,187	366,966	323,276
Imports live animals	796.8	94.4	0.0	527.3	0.0	469.9
Exports live animals	0.3	2071.9	74.1	0.0	0.2	0.0
Net production	359,487.4	331,915.5	329,202.9	292,714.3	366,965.8	323,745.9
Beginning public stocks	0.0	0.0	0.0	0.0	0.0	0.0
Imports meat	5.4	0.0	3.1	0.0	9.5	0.0
Exports meat	58.7	53.9	31.7	91.3	38.6	33.5
Ending public stocks	0.0	0.0	0.0	0.0	0.0	0.0
Consumption	359,434	331,862	329,174	292,623	366,937	323,712
Population (mill.)	67.804	68.365	69.302	70.231	71.152	72.065
p.c. Consumption (kg)	5.30	4.85	4.75	4.17	5.16	4.49
Self-sufficiency	99.8	100.6	100.0	99.9	100.0	99.9

Annex 2: Country profile for pig-meat (pork)

Years	Pig (number)
2000	274
2001	86
2002	37
2003	280
2004	174
2005	14

Annex 3: Country profile for poultrymeat

tonnes	2000	2001	2002	2003	2004	2005
Gross indigenous production	662,748	629,888	726,607	905,251	914,458	979,413
Imports live animals	309.8	187.0	127.5	66.8	81.0	56.9
Exports live animals	152.7	252.1	570.5	308.1	237.5	615.4
Net production	662,905	629,823	726,164	905,010	914,301	978,855
Beginning public stocks	0.0	0.0	0.0	0.0	0.0	0.0
Imports meat	1,446.0	211.4	38.1	81.6	20.2	164.0
Exports meat	10,527.3	24,417.2	20,250.0	25,169.4	29,160.7	46,320.0
Ending public stocks	0.0	0.0	0.0	0.0	0.0	0.0
Consumption	653,824	605,617	705,952	879,922	885,161	932,699
Population (mill.)	67.804	68.365	69.302	70.231	71.152	72.065
p.c. Consumption (kg)	9.64	8.86	10.19	12.53	12.44	12.94
Self-sufficiency	101.4	104.0	102.9	102.9	103.3	105.0

Annex 4: Country profile for sheepmeat and goatmeat

tonnes	2000	2001	2002	2003	2004	2005
Gross indigenous production	132,534	101,799	91,282	74,493	80,015	86,133
Imports live animals	0.1	1.9	0.0	0.0	0.0	0.0
Exports live animals	4.7	11.766.7	8.298.3	871.7	611.4	0.0
Net production	132,529.4	90,034.2	82,983.7	73,621.3	79,403.6	86,133.0
Beginning public stocks	0.0	0.0	0.0	0.0	0.0	0.0
Imports meat	40.0	20.2	1.0	0.0	0.0	0.0
Exports meat	1,017.1	304.9	13.4	3.8	14.1	25.5
Ending public stocks	0.0	0.0	0.0	0.0	0.0	0.0
Consumption	131,552.4	89,749.5	82,971.2	73,617.5	79,389.5	86,107.5
Population (mill.)	67.804	68.365	69.302	70.231	71.152	72.065
p.c. Consumption (kg)	1.94	1.31	1.20	1.05	1.12	1.19
Self-sufficiency	100.7	113.4	110.0	101.2	100.8	100.0

Annex Table 1. Number of Cattle (heads)

	Breed	Cross breed	Local	Total
2000	1,806,000	4,738,000	4,217,000	10,761,000
2001	1,854,000	4,620,000	4,074,000	10,548,000
2002	1,859,786	4,357,549	3,586,163	9,803,498
2003	1,940,506	4,284,890	3,562,706	9,788,102
2004	2,109,393	4,395,090	3,564,863	10,069,346
2005	2,354,957	4,537,998	3,633,485	10,526,440

Source: TURKSTAT, 2005. Summary of Agricultural Statistics.

Annex Table 2. Number of Pigs (heads)

	Pig
2000	3,000
2001	2,700
2002	3,595
2003	7,090
2004	4,399
2005	1,934

Source: TURKSTAT, 2005. Summary of Agricultural Statistics.

Annex Table 3. Number of Poultry (heads in one feeding period (cycle?))

	Broiler	Laying hens	Total	Turkey
2000	193,459	64,709	258,168	3,682
2001	161,899	55,676	217,575	3,254
2002	188,637	57,139	245,776	3,092
2003	217,133	60,400	277,533	3,994
2004	238,102	58,774	296,876	3,902
2005	257,221	60,276	317,497	3,697

Source: TURKSTAT, 2005. Summary of Agricultural Statistics.

Annex Table 4. Number of Small Ruminants (heads)

	Sheep	Goat	Total
2000	28,492,000	7,201,000	35,693,000
2001	26,972,000	7,022,000	33,994,000
2002	25,173,706	6,780,094	31,953,800
2003	25,431,539	6,771,675	32,203,214
2004	25,201,155	6,609,937	31,811,092
2005	25,304,325	6,517,464	31,821,789

Source: TURKSTAT, 2005. Summary of Agricultural Statistics.

Annex Table 55. Farm Structure 2001.

Farm Size, ha	No. of Farms	No. of Small Ruminants	No. of Cattle
Total	3,075,515	27,511,119	11,145,155
No land	54,321	1,812,988	299,658
>2,5	177,891	578,849	265,274
2,5-3,5	290,328	1,151,677	479,804
3,6-7,5	539,508	3,685,515	1,250,687
7,6-19	950,542	6,465,595	3,128,721
20-40	560,005	5,426,756	2,746,218
40-79	327,327	4,396,438	1,852,127
80-199	153,688	3,250,854	948,992
200-399	17,428	422,884	111,534
400-999	4,199	195,721	44,149
1000-1999	222	24,186	2,435
>2000	56	99,656	15,556

Source: TURKSTAT, 2001. Census of Agricultural.

Annex Table 6. Livestock Fattening Farm Structure (2001)

Size of holdings	Number of Holdings	Number of animals
1 – 4 animals	33,205	89,816
5 – 9 animals	15,151	101,762
10 - 19 animals	13,246	156,082
20 - 49 animals	6,684	195,862
50 - 149 animals	2,067	118,986
150 - 299 animals	240	60,417
300+ animals	623	449,828

Source: MARA

Annex Table 7. Meat Plants Situation (2006)

	Number	Average capacity for cattle slaughtering
Private slaughterhouses	210	
Public slaughterhouses	445	
Total Meat Plants	655	
Private slaughterhouses Class 1	191	86
Private slaughterhouses Class 2	19	18
Private slaughterhouses Class 3	0	0
Public Slaughterhouses Class 1	5	42
Public Slaughterhouses Class 2	0	0
Public Slaughterhouses Class 3	440	4

Source: MARA, 2005. Data files.

Annex Table 8. Carcass Standards in Turkey

Young Bull and Heifer	Culled Cow, Steer and Bulls	Lamb, Sheep, Goat
Extra		Extra
1 st Class	1 st Class	1 st Class
2 nd Class	2 nd Class	2 nd Class
3 rd Class	3 rd Class	3 rd Class

Standard TS 666, 667, 668, 670, 671

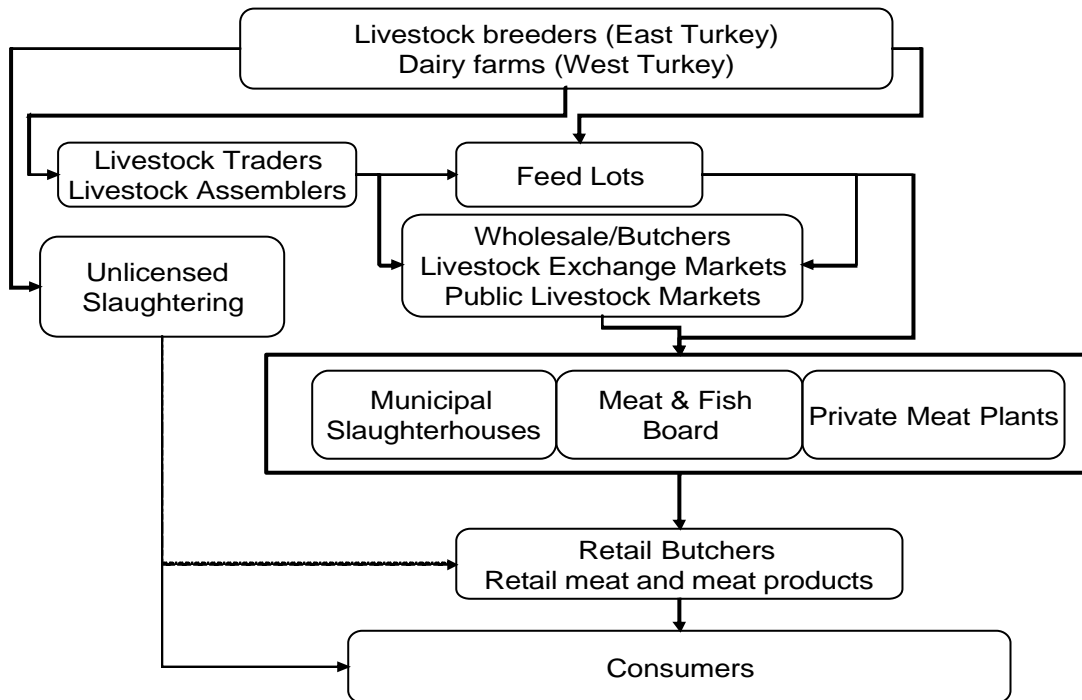


Figure 1: Red Meat Marketing Chain