

Iranian sheep and goat industry at a glance

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Abstract

Agricultural sector accounts for about 1/3 of the Iranian GDP and 1/4 of the country workforce. More than 90% of the Iranian food requirements are produced in the country. Animal agriculture covers over 40% of the agricultural activities. More than 57% of the available animal units in the country are sheep and goats. Desertification, deforestation, water shortage, erosion, low efficiency and out-put and mostly illiterate small farmers are the typical Iranian agricultural obstacles. Iranian sheep and goat industry is characterized by; owned by small farmers, based on extensive grazing, highly influenced by the environmental variables, its increment rate is declining in comparison with the past decades because of urbanizations industrialization and low income. All of the Iranian sheep breeds except one are fat-tail and various coat colors from white to black and many classes between. There are more than 28 distinctive breeds of sheep in Iran which appear in a variety of size, shapes, types and color. Broadly the country sheep are grouped into 4 main types of, meat, dual-purpose, fur-producing and dairy breeds. Baluchi, Karakul and Zel sheep are the typical breeds. Unlike sheep, Iranian goats are not grouped well according to their products importance. More than 20 breed of goats have been recognized in Iran but the two typical breeds are Marghoz and Raeni goats which produce attractive and expensive mohair and kashmir fiber. Sheep and goat systems in Iran are changing rapidly in response to variety of drivers. The annual increment rate for sheep during the 30 years period (from 1967 to 1997) was 721,667 head sheep per year. The increment rate of sheep population for the last decade (1997 – 2007) was only 15,400 head sheep per year. These figures clearly show the reduction rate for sheep population during the noted decade was 46.9 times in comparison with previous period (30 years). This trend is even worse for Iranian goat population. The carcass weight of both sheep and goats gets heavier with advancing the seasons, probably due to their growth pattern and maturity. About 52.% of Iranian sheep and goats are slaughtered under the legal controlled healthy conditions and nearly 48% of these animals are slaughtered out of the slaughter houses in spite of its danger to the public health. The overall reproduction performances of Iranian sheep and goats are lower than the exotic pure breeds. It seems the variability in environmental patterns such as low rainfall and feed shortage, uncertainty in farmers' income and market conditions will be the most important factors in pushing the compulsory transition in Iranian sheep and goat industry. This transition may have critical effects on the animal-based food security mainly red meat. Therefore, more attention is required from the government and non-governmental organizations for handling this trend to the well-managed right direction.

Key words: Iranian sheep, goat breed, Animal unit, Slaughter house, Carcass

Introduction

Iran as the 17th largest country in the world (1,648 million km²) is located at the heart of Middle–East and bridges the Caspian Sea to Persian Gulf and East of Asia to the West of Asia. Total population of the country is 70.5 million with urban and rural population of 68.4% and 31.6% respectively. Average population growth rate is 1.6%. Its mean of annual rainfall is 250 mm or one third of the world (6).

Iran has various agro-ecological zones from arid to semi–arid, humid to temperate and highland cold types, but most of the country is under arid and semi–arid climate. There is about 14.2 million hectare forest land in the whole country. Although, this country has 86 million hectare, pastoral land in form of natural pastures (rangeland) and mostly are of low and medium in quality (more than 91%). Agricultural land area is about 17.7 million hectare with various types, quality and water availability (11).

Agricultural sector account for about 1/3 of the national GDP and 1/4 of the country work force. More than 90% of the Iranian food requirements are produced in the country and its export ranking is number 3 after oil and industrial goods (6).

There are 128.7 million animal units (one mature sheep) in Iran. The number of sheep and goats are 52.2 and 25.9 million heads respectively. Per capita consumption of red meat, with meat, milk and eggs are; 12.7, 28.4, 115 and 9.8 kg/person/year respectively (5).

The domesticated sheep and goat breeds are probably originated from the wild sheep and goat species which are still found in many parts of Iran. Two main stocks of wild sheep, Asian mouflons (*Ovis orientalis*) and the smaller type Asiatic Urial (*Ovis vignei*), as well as the main wild progenitor of domesticated goat (*Capra hircus*) by name of Bezoar goat (*Capra aegagrus*) are easily found in the protected natural areas and national parks in Iran (2,3).

Major characteristics of Iranian sheep and goat industry

Sheep and goats form the most important group of ruminants in Iran mainly in rural areas. More than 57% of the available animal units in the country are sheep and goats (5). Most of the sheep and goats keepers which are mainly small farmers regard this enterprise as a complementary enterprise to plants culture or horticulture. On average every sheep or goat keeper has 38 and 25 heads of animals respectively. Iranian sheep and goat industry is characterized by (8, 9):

- 1) Owned by small farmers
- 2) Based on extensive grazing
- 3) Highly influenced by the environmental variables (rain fall, weather, feed supply, drought etc) (5,7)
- 4) Economic variability due to uncertainty in feed availability, weather, rainfall, market, export and import animal products mainly food materials.
- 5) Its number or increment rate is declining in comparison with the past decades (because of urbanizations industrialization, low income, etc).
- 6) Genetic structure and physiological characters of the most Iranian sheep and goats are not clear.

- 7) No comprehensive standard investigation had been carried out on distinguishing different breeds of these animals. What is known as breed of sheep or goat is based on the apparent physical conformation and.
- 8) All of the Iranian sheep breeds, except one (Zel breed) are fat-tail types.
- 9) Although Iranian sheep and goats are grouped according to their main product, but generally they are kept for providing different products or sources of income including meat, milk, fiber and hide.
- 10) These small ruminants are resistant to high level of inorganic minerals in feeds and forages.
- 11) Iranian sheep and goat live and produce over a remarkable wide range of environments from the desert type dry and warm climate to the mountainous cold zones.
- 12) Iranian sheep and goats appear in different color from white to the completely black and many classes between.
- 13) Iranian sheep produce mainly coarse fiber which is suitable for Iranian carpet industry.
- 14) Most of Iranian breeds are high-set animals which is a suitable character for grazing over the rocky and mountainous areas.

The main obstacles of Iranian agriculture which affects its animal agriculture as well as other agricultural disciplines can be outlined as follows:

- A – Desertification
- B – Deforestation
- C – Water shortage
- D – Erosion
- E – Low efficiency and out-put
- F – Mostly illiterate small farmers

In this paper some elements of the Iranian sheep and goat husbandry and its fluctuation under the present conditions are briefly reviewed.

Breeds of sheep in Iran

It has been noted that there are more than 28 distinctive breeds of sheep in Iran which appear in a variety of size, shapes, types and color. Broadly speaking, there are 4 main types of sheep as follows (8, 9, 10, 12).

- 1- Meat type
 - 1-1 Moghani (Shahsavari)
 - 1-2 Loribakhtiyari
 - 1-3 Zel
 - 1-4 Afshari
 - 1-5 Shal or Chal Ghazvin
 - 1-6 Sangsari
- 2 Dual purpose (wool and meat) type
 - 2-1 Baluchi
 - 2-2 Yazdi
 - 2-3 Kermani
 - 2-4 Sanjabi
 - 2-5 Makoei
 - 2-6 Mehraban Hamadah

- 2-7 Kalkuei
- 2-8 Naeni
- 2-9 Farahani
- 3 Fur type
 - 3-1 Karakul Siyah Sarakhs
 - 3-2 Kabode Shiraz (Khakestari Shiraz)
 - 3-3 Zandi Ghom
- 4 Milk type
 - 4-1 Ghezel
 - 4-2 Kordi

The following is but a brief description of the typical breeds of sheep in Iran.

Baluchi

This is undoubtedly, the most important breed of sheep in Iran and probably in western part of Pakistan. This fat-tail medium size sheep is well adapted to the harsh marginal arid sub-tropical areas around the two big deserts Kavir Lot and Dashte Kavir in central and eastern part of Iran. It is easily recognized by its white coat and black spots in head and legs (10, 14).

Baluchi breed accounts over 29% of Iranian sheep population. Body size varies between 40–60 kg with 1.5-2 kg of medium-quality wool. This is the best fiber for making famous Persian carpets. The milk yield of lactating ewes over a period of 125 days is around 50 kg. Some Baluchi ecotypes produce a wool fiber as fine as merino. Although, this breed of sheep has been grouped as a dual-purpose breed but currently is kept mainly for meat production which is popular for the urban consumers in the area. Wool price is quite low and has no determinable economical impact on the farmers' budget. Unfortunately unlike other agricultural sectors sheep and goat industry receive no subsidizes from the government.

Karakul

Karakul sheep (Known as Karakul Siah (Black) Sarakhs (a city in North-East of Iran).

The lambs of this breed are eminently adapted for fur production, but the adult animals have very low-quality coarse wool which is not comparable the attractive fur of lambs. Karakul sheep are also distributed in Turkmenistan, Uzbekistan Kazakhstan, and Afghanistan (3, 4). It is believed that this sheep is originated from Bokhara area in Uzbekistan. However, mature Karakul sheep are gray in color, fat-tail in conformation and an average body weight of 60-70 for ewes and 80-90 for rams. In the past Karakul sheep were bred primarily for the suitability of lamb pelts for fur production. Persian lamb is famous for fur production and they are the lambs slaughtered in age of 3-10 days. The fiber over skin of these lambs is undeveloped, grows in different directions, and reflects light and giving the pelt unique attractive appearance. However, nowadays these sheep are kept for producing meat as the first sealable product, but in a special desert type climate Known as Gharagham. The population of karakul sheep in Iran is less than 6% of the total sheep population.

Zel

Zel is the only breed of sheep which has tail instead fat-tail. This small sheep has an average body weight of 40-45 kg. The coat of Zel sheep can be appeared in different colors from white to black or brown. The sheep is resistant to the humid and wet environment and parasites. The home and production area of this breed is around Caspian Sea with high rainfall and mostly covered by forests. It is believed this breed is the ancestor of Merino sheep.

Breeds of goats in Iran

Unlike sheep, Iranian goats are not grouped well according to their products importance or color, conformation etc. Although, more than 20 breed of goats have been recognized in Iran but the typical breed are as follows (12):

- 1- Tali or Saheli
- 2- Adani
- 3- Marghoz
- 4- Najdei
- 5- Raeni
- 6- Baluchi
- 7- Mamasani
- 8- Yazdi (Nadoshan)

Similar to sheep, goats are kept for producing different products including, meat, milk, fiber, hide, etc (1, 2, 3). The two main breeds are known for their Mohair and Kashmir production:

Marghoz

This small breed of goat is distributed over the western and North-West of Iran near to the Turkey and Iraqi borders. They produce quite fine Mohair with different colors e.g. white, golden, brown, gray and even black. The average mohair production is about 0.6 kg per year. This fiber type is expensive and mainly exported. Marghaz goats are fertile animals with twin kidding over 30%. It is believed the Angora goats are originated from this breed of goat. Angora goats appear in one color which is white to silver, but Marghoz goats produce Mohair in different natural colors which are a unique character of this type of goat.

Raeni

This type of goat is famous for producing a fine Kashmir fiber with a mean diameter around 18-20 microns. Mean raw Kashmir production by the adult Raeni goats is around 1kg per year which remarkably high. The average body weight of this type of goat is between 30-35 kg. Raeni goats are also important for their ability to survive in the arid sub-tropical environmental areas in Central dry provinces such as Kerman and Yazd.

Transition in Iranian sheep and goat population

Small ruminant systems in Iran are changing rapidly in response to variety of drivers. In 1967 the census figures clearly indicated that there were 30,467,000 head

sheep and 13,329,000 head goats in the country (Table1). Sheep and goat numbers reached 52,117,000 and 25,757,000 head in 1997 respectively. The population of these animals was 52,271,000 head sheep and 25,833,000 head goats in 2007.

Table 1 Number of sheep and goats ($\times 1000$ head) in Iran during different periods

Class of animal	Animal unit factor	Periods		
		1967	1997	2007
Sheep	1	30467	52117	52271
Goat	0.75	13329	25757	25833
Cattle (Large breeds)	8	-----	1855	4619

The annual increment rate for sheep during the 30 years period (from 1967 to 1997) was 721,667 head sheep per year. The increment rate of sheep population for the last decade (1997 – 2007) was only 15,400 head sheep per year. These figures clearly show the reduction rate for sheep population during the noted decade was 46.9 times in comparison with previous period (30 years). This trend was even worse for Iranian goat population. The average increasing rate for Iranian goats was 414267 head goats per year during 30 years Period from 1967 – 1997. This figure was only 7600 head goats per year for the last decade (1997-2007). These values show a reduction rate equal to 54.5 times for the Iranian goat numbers during recent years.

In comparison with the small ruminant population trend the number of cattle (large breeds) has been increased 2.5 times during the decade from 1997 to 2007. Several factors have contributed to the declining trend in sheep and goat numbers rates, including; 1) low rainfall and climatically changes, 2) rangeland deterioration and rapid increasing the cost of animal feeds, 3) lower returns and higher risks from small ruminants than for pure-bred and cross-bred cattle, 4) rapid urbanization, 5) increasing the cost of production mainly feed resources and wages, 6) uncertainties in the public markets and governmental policies for import and export of animal products. Similar situation is going on in many nearby countries (13).

Carcass weight and slaughtering conditions

The average carcass weight of Iranian sheep and goats are summarized in Table 2. In general the carcass weight of both sheep and goats gets heavier with advancing the seasons, probably due to their growth pattern and maturity. In other words in spring and summer lambs grow faster but their body weight is lighter. In autumn and winter they grow slower but have heavier body weight.

Although, large variation in carcass weight and characteristics exists between and within the Iranian sheep and goat breeds as other breeds of these animals throughout the world, but generally the carcass weight of fattening small ruminants in Iran is over 55% of their live weight. Fat content of Iranian sheep carcasses is lower than 20%. Typically Iranian sheep carcasses have significant lower amount of fat within the muscles in form of marbling, probably because of their fat-tail which is a pure fat reservoir.

Table 2 Mean carcass weight (kg) of Iranian sheep and goats during different seasons

Class	Spring	Summer	Autumn	Winter	Average
Of animal					
Sheep	17.5	18.1	19.5	19.9	18.8 ± 1.1
Goat	13.0	13.1	13.5	13.6	13.3 ± 0.3

A summary of the results on sheep and goat slaughtering in industrial and semi-industrial slaughter houses is presented in Table 3. The Table revealed that about 52.3% of sheep and goats are slaughtered under the legal controlled healthy conditions. Although no formal figure was found on this subject but it was suggested from the hide (skin) production in the country which is formally published every year. Hide or skin marketing mainly of small ruminants is an open and real ongoing market throughout the year in all Iranian cities. Nearly all of the produced skins are exported. Therefore, the published data in skin production are correct. According to these data the real percentage of slaughtered sheep and goats in slaughter houses is 28.3% in 1997 and 28.2% in 2007.

Table 3 Number of live and slaughtered sheep and goats in industrial and semi-industrial slaughter houses and skin (hide) production on Iranian sheep and goat industry during 2 different periods

Item	Periods	
	1997	2007
Live sheep and goats	77874000	78104000
Slaughtered sheep and goats	11215024	11837000
Skin (hide) number	22077278	22023513

The recorded data in Table 3 indicate that around 48% of Iranian sheep and goats are slaughtered out of the slaughter houses in spite of its danger to the public health. It must be noted that different bodies in the government and non-governmental organizations encourage the farmers or butchers to slaughter the animals in the healthy condition provided free of charge in slaughter houses but this behavior is changing quite slow and needs some kind of restricted roles with considerable penalties.

Reproduction performances

The average frequencies of reproductive traits are given in Table 4. These data show the overall reproduction performances of Iranian sheep and goats are lower than the exotic pure breeds. Some of the noted negative transition of small ruminants in Iran could be due to these low performances. A higher reproductive performance have been reported by applying the advanced techniques in intensive sheep and goat farming, but their application in large scales or in the extensive systems is under the critical question.

The main obstacle in applying these new techniques is lower income of small farmers. Unfortunately, these poor farmers receive no help or subsidizes from the governments. About 70% of Iranian ewes show estrus cycles in late of summer. The other 30% come into heat at the end of winter or early spring. Although 2 gestations and lambing have been shown in some sheep herds under the controlled condition but it is hard to be applied in the extensive system in rural areas or nomadic systems.

Table 4 Some reproductive performances (%) of Iranian sheep and goats

Trait	Sheep	Goat
Fertility	93 ± 4	95 ± 6
Prolificacy	99 ± 5	110 ± 3
Survival (Birth to weaning)	96 ± 6	103 ± 5
Twins	9 ± 5	18 ± 4
Triplets	2 ± 0.4	9 ± 1

Final remarks

There are still the great deal that are not well understood concerning the different aspects of sheep and goat husbandry, interactions between industrialization, urbanization and the trends of small ruminants production in Iran. This fact is well-known that Iranian sheep and goat population will be decreased and changed dramatically with respect to their systems, locations, herd sizes and specialization in the future but at the same time the price of their products mainly meat will be increased. It seems the variability in environmental patterns such as low rainfall and feed shortage, uncertainty in farmers' income and market conditions will be the most important factors in pushing the compulsory transition in Iranian sheep and goat industry. This transition may have critical effects on the animal based food security mainly red meat from small ruminants which is popular for Iranian consumers. Therefore, more attention is required from the government and non-governmental organizations for handling this trend to the well-managed right direction.

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