International Journal of Current Advanced Research
ISSN: O: 2319-6475, ISSN: P: 2319-6505, Impact Factor: 6.614
Available Online at www.journalijcar.org
Volume 9; Issue 05(B); May 2020; Page No.22095-22102
DOI: http://dx.doi.org/10.24327/ijcar.2020.22102.4355

Research Article

MUTTON PRODUCTION, DEMAND AND SUPPLY IN JAMMU AND KASHMIR AND ITS AUGMENTATION

Muhammad Maroof Shah, Showkat Ahmad Ahanger, Tanveer Ahamad Rather, Mubashir Ali Rather Ambren Hamdani and Imran Bashir

Department of Sheep Husbandry, Kashmir-191 111, Jammu and Kashmir

A R T I C L E I N F O

Article History:
Received 4th February, 2020
Received in revised form 25th March, 2020
Accepted 18th April, 2020
Published online 28th May, 2020

Key words:
mutton production, Kashmir, augmentation and future strategies

A B S T R A C T

Despite having favorable environmental and geophysical conditions for sheep rearing and a huge market for meat and meat products, Jammu and Kashmir imports on an average 14729899 heads of small ruminant annually for slaughter from the deserts of Rajasthan to make up the deficit. This results in an annual loss around 40 crores. The importation of sheep and goat for slaughter presented an increasing trend over the years from 2002-03. Further, considering the projected human population, production, consumption behavior and import of small ruminant (goat and sheep) in the J&K, there is a deficit of 257.57 to 710.88 lakh kg. The gap between supply and demand is expected to get widened in future. The paper reviews the prospects of filling this deficit indigenously. The present article is primarily devoted to exploring some complex dynamics of Kashmir mutton industry and contextualize mutton production and its augmentation for envisaging future strategies.

INTRODUCTION

Today we are repenting our enthusiasm for anthelminths, pesticides and much of drug industry in general. These have in many ways, led to ecological disasters. People are even talking about another revolution that corrects the misdeeds of previous revolutions in food production. Judging from the present state of affairs which starkly foregrounds our dependence on imports from other states in these sectors and the huge gap between potential and actualization or realization of that potential it is safe to declare that these schemes had only a marginal impact so far. We are far from declaring cattle/sheep rearing an industry and unable to generate sufficient jobs for the unemployed folk. It means mutton industry despite such a huge market is yet to come to its age in Kashmir. In many respects these sectors are showing decline and many farmers are seeking alternative employment prospects. Increased urbanization, upward mobility of classes due to development, education and nonagricultural business ventures which are however mostly tied to non-indigenous interests and market forces and based on exploitation of some class or community have also weakened mutton industry in Kashmir. We are quite short of project consultants, architects and engineers specializing in designing farms, professional farmer who can supply quality animals to anyone interested as government farms can supply only fraction of the elite Rams required and there are no suppliers of quality ewes for new entrepreneurs, no facilitation for letting investors invest in livestock farming without involving themselves in any sense the way banks/insurance companies invest our money and give guaranteed returns, no fodder banks, no surveillance of diseases at entry points, no slaughter houses for the majority of slaughtered sheep. Neither local nor nonlocal investment has been made in any significant sense in mutton industry for no good reasons. Perhaps our private sector lacks the will. Our fundamental problem is shrinking pastures. Even with all the economizing methods such as use of green house for forage cultivation, unconventional feeds and fodders, feed-block technology we can't fulfill feed deficiency we currently face. If we want to be self sufficient in livestock products today and in future when demand will rise we have to plan in a big way and prioritize livestock sector. Sometimes questions are raised regarding our attitude to mutton consumption and there are advices for revisiting it. The question is: Is it possible to be revisited? How far can we or should we reduce consumption of mutton? And do we have alternate sources of protein and other resources to fill the vacuum in our culture that would result from drastic reduction in consumption of it?

METHODOLOGY

To analyze the importance of meat in culture of Kashmir and trends in its production, import, demand and consumption in the Jammu and Kashmir, secondary data pertaining to history, import, production of sheep and goat in the J&K was obtained from various sources like Department of Sheep Husbandry, Animal Husbandry Department, and Livestock Census reports of India were collected and used. Microsoft Office Excel 2007

Corresponding author:* **Muhammad Maroof Shah
Department of Sheep Husbandry, Kashmir-191 111, Jammu and Kashmir

used for tabulation, calculation and graphical interpretation of data.

RESULS AND DISCUSSION

Mutton consumption in our history and culture: The patterns of food production and consumption are the core of all human ecology (Dietz *et al*. (1996)). Evidence for hominid and early human was omnivore is rich and indisputable (Kiple, 2000; Larsen, 2000; Stanford and Bunn, 2001; Wing, 2000). Similar scenario was observed while studying History of Kashmir. Sheep were reared in Kashmir from times immemorial. The findings of the famous Neolithic site of Kashmir-Gufkkral testify to the large scale domestication of sheep and goat in Kashmir around second millennium B.C (Anonymous, 1984). It is difficult to evaluate the love and the desire of Kashmiries for mutton from times immemorial. Further, one of the great religions that were nurtured in Kashmir rejected meat eating. The position of Buddhism and Islam regarding permissibility of meat eating is well known. *Tantricism* openly recommended meat eating and Kashmir and *Saivism* as such was not averse to it. Our geographical and climatic conditions have dictated our cultural choices and religious rulings have been accordingly understood. Meat eating has been made part of *salvific* scheme in *Tantricism*. Meat figures as part of many religious/cultural rituals. It can well be said that our culture invokes meat symbolism quite pervasively. Our best moments are made delightful by virtue of meat. Our coming hither and departing from the world, our marriages, our festivals, our sacred days, our solemn moments are all marked by this "symbol" of meat eating. Nothing can wean Kashmir from *wazwaan* although extravaganza and wastage must be condemned. *Wazwaan* is such a glory because of meat. Thus meat is not simply a question of biology but of our cultural and spiritual heritage. Kashmir without meat (mutton) is not conceivable. The *Wazwaan* is a combination of ethnic meat products. The blend of various aromatic spices with meat and meat products is the basis for ethnic/heritage Kashmiri meat products. *Kabab, methi maaz, rogan josh, aab gosh, rista, nate-yakhni, tabak maa* and *goshtaba* are some of the important meat products of *wazwan* prepared from prerigor hot boned tender lamb or beef meat (Samoon *et al*., 1994; Rather *et al*., 2014). More than cultural question it is a biological question as well here that we need to explore.

Meat and our biology: There is a debate on importance or necessity of meat in our diet. This debate is often based on wrong information, cultural prejudices and failure to take note of varied contexts. There are no universal black and white answers. But what can't be debated is the following. Among animal foods, meat is highly nutritious and has become an integral component of human diet being a rich source of valuable proteins, vitamins (including vitamin B12), minerals, micronutrients in particular meat and fats (Devi *et al*., 2014) hence can't be complemented by plant foods. Meat is also concentrated source high quality (NPU 0.75-0.8) proteins. It is highly digestible, about 0.95 compared with 0.8-0.9 for many plant foods. It provides is rich source of essential amino acid like lysine which is in relatively short supply in most cereals. The damage caused by cooking to proteins in meat is of little practical significance owing to its high concentration in meat.

Is meat indispensable? Meat may not be declared an essential part of the diet but without animal products it is argued that it is "necessary to have some reasonable knowledge of nutrition in order to select an adequate diet. Even small quantities of animal products supplement and complement a diet based on plant foods so that it is nutritionally adequate, whether or not there is informed selection of foods." However biological argument should not be used to decide the matter in our conditions. Here meat is an inseparable part of culture. It is not dispensable. As per standard scientific recommendations average protein requirement for a human being is 1g /kg of body weight/ daily/ with 50% from animal sources. Human requirements for protein have been estimated by FAD/WHO to be 55 g per day for adult man and 45 g for woman. The protein requirement of human beings increases in various disease states, body injuries and stressful conditions. The 50% daily requirement of proteins can be met through consumption of milk and eggs at recommended level and the rest has to come from meat (red and white) for non-vegetarian people. Keeping consideration of meat bone ratio in meat in the market we see that a meat piece is needed to be taken daily. Calculating our requirement for a population of 1 crore population (assuming the rest of population to be pure vegetarian) on this basis we need 20 crore kg. Thus we need more meat than is available and whatsoever is available is quite asymmetrically distributed as much of the available meat goes to urban elite. Middle classes eat mostly on different functions, festivals and marriages or when guests come. Poor and marginal people can enjoy it only very occasionally. Thus we can safely say that J&K is not a meat sufficient region. There is overconsumption on marriage/festival days and generally under consumption on routine days. Guests are overfed and hosts underfed. In fact in India per capita availability of animal protein is 10g only while need is around 25g. There should be an informed debate on the question of how far can/should poultry replace sheep? Should there be policies for regulating our long term consumption? We need to discuss short and long term environmental and economic costs of sheep versus poultry sector.

Mutton associated industries: It is strange that our civil society is concerned with reducing imports of livestock products or rising price of meat but not with the industries that would help us reduce imports or control price by value addition, preventing wastage of byproducts and inefficient and unhygienic production practices of farming. Our private sector is focusing on industries that damage environment and depend on non-indigenous raw material or market. There are virtually no mutton associated industries in Kashmir. The private sector is yet to get interested in it. Wastage on account of this is enormous. Wastage on account of loss of blood and offal runs into dozens of crores. Imagine how much our farmers would be empowered if they could get money for many litters of blood, bones, intestines etc. Imagine how many jobs would be created. Pelt based industry would have earned us, according to a conservative estimate around 18lac x1000=1.8 billion and generated thousands of jobs as value addition to pelts we export to neighboring states increases their value by more than 1000% by a very conservative estimate. It could well go over 2000%.

How much demand of mutton can we fulfill: As population is growing, pastures sinking, urbanization fast apace abnormally huge and ever growing demand can't be fulfilled in near future! Imports could be reduced but not dispensed with. Although we can go for limited horizontal increase in sheep population as the present population has been subject to a host of pressures from forest department, construction industry and

urbanization drive and a transition economy, we can make significant difference through improvement of productivity and save almost half the money on imports. We can't be 100% self sufficient given low growth rate of small ruminants and relatively fixed slaughter rate. Those who cry over failure to curtail all livestock imports are mostly ignorant of elementary laws of biology and ecology. But a planned informed scientific consumption pattern and control over wastage and cold chain in action would make significant difference. Two days closing of mutton shops, observing no meat day once every month and one weak every year and issuance of only limited amount for marriages and routinely to elite families would make some reduction in extravagant consumption and send a message for increasing local production. If we, as a community, vow to fill up the bulk of local demand we can and the key would be improvement in productivity.

Scenario at national level: Worldwide goat and sheep population, unlike most other livestock species, has increased steadily during recent years. Their numbers are increasing much more rapidly in the developing than in developed regions. This is mainly due to the ability of small ruminants to survive and produce on low inputs, their adaptability to wide range of environment. Protein consumption in our country is only about 10 gm/ capita per day as against the world average of 25 gm/day per head. The average carcass weight in case of goat and sheep is 10 and 12 kg, respectively which is lower than even from Pakistan being 17 kg and China being 13 & 15kg (Agnihori and Rajkumar 424). The small size of goats and sheep enables them to be slaughtered hygienically. Carcass size is sufficient to meet small family needs and doesn't pose marketing and distribution problems. Unlike cattle and pigs, mutton and chevon is acceptable across faiths. Due to these factors their slaughter rate is high (48 and 38% for sheep and goat). Bird flu has opened new market for mutton etc. Considering 70% population as non-vegetarian the annual per capita availability of meat is roughly 5 kg as against the recommended intake of 11kg (Agnihori & Rajkumar). The protein supply from meat in India is only 1.7g/day as against 8.8g in developing and 25.6g in developed countries (Agnihori & Rajkumar 427). In India 38% goats are slaughtered annually compared to China in which 49% and 56.6% in Pakistan. For sheep the figure is 32%. Lower slaughter rate is, as Karim notes, due to poorer reproductive efficiency performance (65-70%) of small ruminants under field conditions while for successful mutton production progamme higher prolificacy of the animals with twining is an essential trait (Karim, 2008). The average body weight of Indian sheep and goats is "considered to be 22-25 kg and carcass weight 10 kg as against the production level of 25 kg carcass weight in developed countries." With in vogue feeding management without organized inputs, the lambs and kids in active phase of growth hardly achieve 40-50g avg. daily gain and marketed for slaughter around 9-12 months weighing about 20-22 kg (Karim 2008). CSWRI study reported increased growth rate of native sheep by 300% with 18-20% feed conversion efficiency. Large scale adoption of this technology is not effective due to poor economic background of sheep farmers (Karim 2008). Poor economic background of sheep farmers in Kashmir is one of the biggest obstacles in making sheep farming and mutton production a vital intensive advanced industry. The contribution of buffalo meet has increase and small ruminants decreased over the years as the latter could not meet the demand. Sheep contributed only 5.4% in 2000 to total meet produced. Currently the share of sheep and goat together is around 15% in meat production and that of cattle and buffalo is 65% (Karim 2008). The best candidate for increasing meat production is buffalo in India and this applies to J and K as well. But this seems to be hardly noticed so far. Experts are advocating focus on development of buffalo for meeting our mutton production. It is argued, keeping in view good population of buffalos, much higher body weight of them and males being. Despite advantage in market (small distance to Middle East's market from Indian ports) in India sheep and goat meat export is hardly 2% of total production. This is a matter of concern.3% of meat produced in India is processed into ready to eat meat products as against 80% in Finland and 50% in Russia. Based on nutritional considerations of providing 20g/per/person/day (against world average of 29g as against Indian availability of 10g) nearly a doubling of all animal products production is desired.

Markets potential: There is much indigenous demand that consumes indigenous mutton production. However, a small part, nevertheless, goes outside though this is not true for Kashmir and competitive advantage to local farmers that might be interested in exporting their produce is yet to be debated. Partly due to non-development of processing industry and hygienic slaughter in Kashmir this opportunity is not currently available. India also exports small quantity of processed meat. Sheep and goat meat mainly goes to UAE, Iran and Jordan. Our meat is sold largely as fresh and frozen and not much as value added processed products. This applies, in case of Kashmir, to pelts as well. India has yet to extend its market for meat to the developed western world although potential is very large. Indian produce has some advantages that should secure it competitive advantage. These include:

1. Low fat and low cholesterol, which is a fear with most of the red meat. This is because livestock in India are mostly organically reared on green pastures and agricultural crop residues.
2. Meat cum bone meal, blood meal and carcass meal are not fed to cattle and buffalos here.
3. Hormones, antibodies and antibiotics are not generally used for promoting growth and fattening of livestock. This sector, therefore, has great opportunities.

However as the demand is for safe and wholesome meat our State is unable to tap bigger markets. List of our bottlenecks in this regard include unhygienic production of meat, contamination, poor infrastructure of abattoirs, unscientific processing, absence of cold chain, poor packaging and near absence of meat safety management systems.

Taxing or subsidizing sheep farmers: The problems of sheep farmer were never settled and relatively primitive system of sheep rearing that obstructs professionalization and industrialization has long legacy. While as this sector demanded various incentives and subsidies it was heavily taxed and today the situation is not much different in terms of class relations and exloitation of poor sheep farmer although direct taxes are not there. Lawrence has noted heavy taxation of sheep breeder by writing "a tax of two *annas* per sheep was taken by the state". A tax of thirteen chilki was levied per hundred sheep. A tax of *Zari-i- Chaupan* was levied on every sheep and lamb 1 anna in the year 1834, but it was slightly increased at the end of the Sikh rule and the rate of tax was about Rs 8 per hundred sheep and goats (Lawrence, 1884). The

total tax realized in 1847-48 was Rs 42,187. During Dogra period 2 ½ *annas* were collected per head for sheep and goats, Wazir Ratnu, Governor of Kashmir during Gulab Singhs time collected 80,000 heads of sheep and 16 kharwars of wool, although the total revenue fixed under this head was Rs 70,000 only. (Mirza, 18-19). Since the weaker section could not afford to pay the tax thus sheep rearing became a monopoly of the rich people. Although *Maldar* (a person having a good number of cattle) got much output due to the excessive application of *mengan,* but maximum land remained under low production because of deficiency of adequate supply of manure.

Current Status*:* The J&K State leads in mutton consumption. The demand of mutton is ever increasing and present availability of mutton from local resources is about 278 lac Kgs and about 210 lac Kgs is imported from other states. Relevant data is presented in Tables 1, 2, 3, 4, 5 and 6: Today the figures show only certain increase in imports rather than decrease and we around Because of the predominant non-vegetarian food habits, the state is acutely short in animal protein requirements. The meat deficit in Jammu and Kashmir was calculated on the basis of Indian Council of Medical Research (ICMR) recommendation, i.e. requirement of meat at the rate of 35 grams/ person/ day for 313 days or 10.95 Kg/ capita/ year, for a given human population (Planning commission, 2002). The total population of Jammu and Kashmir was 125.413 lakh in 2011 and projected population estimate of the state for the year 2016-17 was 133.47 lakh in 2013-14 (Census, 2011). Further, the sample registration system reports 69 per cent of the population of Jammu and Kashmir to be non-vegetarian, i.e. 92.09 lakh (Baseline survey, 2014). Therefore, as per the projected population, production and import of mutton/ chevon, a deficit of 710.88 lakh Kg for the total population and a deficit of 257.57 lakh Kg for the non-vegetarian population (69%) of the Jammu and Kashmir state can be estimated. The deficit estimated by Sheep Husbandry Department with relevance to previous Census (2001), when the population of the state was 101.98 lakh, was 611.16 lakh Kg for whole population and 416.24 lakh Kg for the non-vegetarian population of Jammu and Kashmir. Therefore, rather than declining, there has been an increase of about 99.72 lakh Kg in the deficit for meat availability for whole population of the state, over a decade. However, the deficit of meat for the non-vegetarian population of the state has shown a decrease of 158.67 lakh Kg. This may be since the department had calculated the non-vegetarian population of the state to be 84 per cent (84.26 lakh), at that time. The average annual meat consumption in Ethiopia is estimated to be 8 Kg/ capita/ yr. Meat consumption in USA is about 124 Kg/ capita/ yr (340g/day) and the global average meat consumption is 38 Kg (104g/day) (EARO, 1999).

Table 1 Population dynamics of sheep and goat in Jammu and Kashmir

Year	Sheep	Goat	Tatal
1951	9.78	4.87	14.65
1956	14.65	8.15	22.80
1961	11.62	5.77	17.39
1966	11.51	6.05	17.56
1972	10.72	5.69	16.41
1977	12.16	6.91	19.07
1982	19.09	10.04	29.13
1987	12.41	3.41	15.82
1992	29.47	17.66	47.13
1997	31.70	18.10	49.79
2003	34.14	20.55	54.69
2007	41.85	22.60	64.45
2012	33.84	23.04	56.88
2019	32.00	17.30	49.30

Source: Livestock Census reports of India.

Table 2 Annual importation for slaughter

Year	Sheep	Goat	Total (heads)
2006-07	1374530	109097	1483627
2007-08	1345241	94526	1439767
2008-09	1296732	96208	1392940
2009-10	1486757	64667	1551424
2010-11	1245876	49066	1294942
2011-12	1250717	43103	1293820
2012-13	1351301	29101	1380402
2013-14	1324058	46697	1370755
2014-15	1269540	17729	1287269
2015-16	1200056	10258	1210314
2016-17	1013506	11133	1024639
2017-18	1650080	923490	2573570
2018-19	1432450	777930	2210380

*Source: Sheep Husbandry Department, Jammu and Kashmir (2016)

Table 3 Import of small ruminants in J&K 1973-74 to 2009-10 (No.'s)

1973-74	547139
1977-78	675001
1980-81	932772
1985-86	1149855
1990-91	724839
1995-96	929797
1999-00	1242634
2000-01	1407405
2001-02	1274297
2002-03	1374774
2003-04	1352828
2004-05	1361728
2005-06	1466237
2006-07	1428497
2007-08	1597081
2008-09	1422870
2009-10	1586530
2010-11	1294942
2011-12	1293820
2012-13	1380402
2013-14	1370755
2014-15	1287269
2015-16	1210314
2016-17	1024639

source: Digest of Statistics 2014-15 (xxii-trade And Commerce, Table No. 22.00, Goods Imported Into The State), Page 371-373

Table 4 Mutton and chevon production in Jammu and Kashmir

Year	Meat production in Jammu division (lakh Kg)	Meat production in Kashmir division (lakh Kg)	TotalMeat production (lakh Kg)
2002-03	-	121.45	-
2003-04	-	122.65	-
2004-05	-	127.66	-
2005-06	-	128.35	-
2006-07	-	129.22	-
2007-08	-	129.87	-
2008-09	-	130.35	-
2009-10	-	131.42	-
2010-11	-	133.77	-
2013-14	209.47	106.35	315.82
2014-15	211.97	107.03	319
2015-16	214.4	107.56	321.96
2016-17	214.77	108.8	323.57

*Source: Sheep Husbandry Department, Jammu and Kashmir (2016),

Table 5 Mutton and chevon availability and requirement in J and K

S.No	Division	Sheep and goat population (lakhs)	Mutton/ Chevon production (Lakh kg)	Import of mutton (Lakh kg)	Total mutton availability (Lakh kg)	Human population (lakhs)	Non-vegetarian Population (lakhs)
1	Jammu	39.07	169.2	63	232.3	44.3	26.58
2	Kashmir	21.68	106.88	147	253.88	54.77	54.77
3	Ladakh	6.39	24.54	0	24.54	2.91	2.91
4	Total	67.14	300.62	210	510.72	101.98	84.26

Table 6 The body weight traits of some breeds reared in Kashmir

Breed		BW	WW	6MWT	9 MWT	12 MWT	18MWT	Reference
Gaddi		1.8	9			17	26.59±1.90	Anonymous . (2004)
Bakerwal		3.18± 0.17	13.46± 2.88			33.00± 2.88	29 to 36	Anonymous . (2004)
Gurez	M	2.54±0.02	8.73±0.08	21.28±0.25		28.60±0.28		Ganai et al. 2010
	F	2.47±0.01	8.70±0.05	21.54±0.19		28.59±0.19		
		3.35±0.01		19.54±0.05		23.44±0.06		
Kashmir Merino		3.45±0.04	11.42±0.19	17.78±0.46	19.75±0 .28	24.07±0.32	32.47±0.49	Rather et al. (2019 c)
		3.34±0.05		19.33±0.45		22.44±0.46		Rather et al. (2019 d)

Table 7 Mutton requirement and availability

Mutton requirement	Values (lac kg)
Total requirement of mutton@35 gm/day/ person for 313 days (ICMR)Recommendations for human population	1121.78
Requirement for non-vegetarian population	926.86
Mutton availability	300.62
Imports	210
Total mutton availiability	510.62
Mutton deficit	
Whole population	611.16
Non-vegetarian population	416.24

Table 8 Estimate production of meat (million tonnes)

1998-99	1.9
1999-2000	1.9
2000-2001	1.9
2001-2002	1.9
2002-2003	2.1
2003-2004	2.1
2004-2005	2.2
2005-2006	2.3
2006-2007	2.3
2007-2008	4.0
2008-2009	4.2
2009-2010	4.5
2010-2011	4.9
2011-2012	5.5
2012-2013	5.9
2013-2014	6.2
2014-2015	6.7
2015-2016	7.0
2016-2017	7.4
2017-2018	7.7
2018-2019	8.1

Source: Basic Animal Husbandry Statistics 2019.

Management of farm animal genetic resources: The mutton production can be augmenting by enhancing litter size, lamb weight at different stages of growth, growth rate, feed conversion ratio, milk yield and decreasing mortality through genetic interventions. Improvement of Kashmir Merino and conservation of native germplasm and providing poor farmers incentives and subsidies on feed and fodder component will definitely improve mutton production in Kashmir. The litter size and lambing % can be improved through introduction and proper follow-up of high fecundity Gene (Fec-B) in local Gene Pool to produce twins and triplets. Therefore, lambing percentage will increase from present 80% to 120%. Blocking huge leakages on a number of points to reduce wastage of feed/fodder, increase conception percentage, decreasing embryonic death, preventing production losses from parasitism and unscientific feeding and other management practices and huge losses from preventable diseases in unorganized, reorganizing labour engaged in rearing by strengthening cooperative mode, involving more professional communities only for rearing and shifting from current one crop/year to around 3 crops/2years etc. are called for. These steps would increase mutton production by a significant percentage (more than 30% by a very conservative without any additional significant burden on existing fodder resources).

The question of nutrition and mutton production: Genetic potential can't be realized without providing adequate nutrition and good environment. As such nutrition augmentation is very important for increasing mutton production by decreasing input cost.

The feed and fodder deficiency at national level (Table 7).

Particular	Deficiency (%)	
	Centre level	Kashmir
Dry fodder	31	27.31
Green fodder	23	67
Concentrate	47	90

Problems with pastures: The available degraded pasture land of 127000 ha is overgrazed, infested with parasitic eggs and larva and having reduced capacity. Therefore, to improve and increase biomass availability following steps need to be considered.

Survey and status: Include Nomadic route mapping and upgradation, Weed management, Reseeding of perennial grasses, Fodder seeds availability, Develop sustainable fodder production in existing cropping pattern, Develop Wheat varieties like developed elsewhere, Manage village grasslands, Develop SALT (slopping agri-forestry livestock technology model in hilly areas, Introduction of fodder trees and fodder shrubs in various agricultural systems, Fodder bank establishment and utilization of energy rich by products

a. ***Utilization of agro-industrial by product:*** Includes use and utilization straw (after treatment with urea and molasses) and apple pomace etc.
b. Utilization of non-conventional feed resources: includes exploring non-conventional feeding system, utilization of tree leaves and seed for ruminants and poultry- complete feed blocks and utilization of aquatic weeds.
c. Developing feed and feeding standards: Prepare inventory of feed resources (to prevent mineral deficiencies), identify seasonal availability, nutritive value and economic benefits of different feed and fodder under various production systems.
d. Efficient utilization of feed nutrients – feed additives research.
e. Area specific mineral supplementations.

Some ethical questions: It seems that ethical questions are hardly raised in our context. It is a matter of concern. Some of these questions that demand answers from all stakeholders including producers and consumers are: How current mode of sheep farming appropriates surplus labour and continues labour exploitation? What gives a particular section/class right to consume so much meat on marriages etc.? How do we compensate those who suffer from diseases transmitted from sheep or sheep products? More meat is wasted in Kashmir

than could have been saved for the days of acute shortage in winters.

Mutton production and environment: There is much loose talk on livestock in relation to environment. Much hue and cry is raised regarding overpopulation without proper empirical surveys and studies that are needed to make big claims. We need to revisit current claims regarding overpopulation of livestock projected by certain environmentalists in view of the following points. There are number of inadequately answered questions connected with this issue. Some of them include the following: What is the sustainable population figure? Who has studied biomass availability? Who has prepared detailed maps of potential pasture resources? Has any study taken account of changing trends in livestock population and changing patterns of feeding them? How do we compensate for encroachments to farmers? How come that forest department consults none of livestock experts while going for steps to deny access to vast areas that have traditionally been harboring grazing livestock? There is yet to be made any comprehensive study on potential fodder resources to claim that sustainable limit of sheep/goat population has been reached. No large scale pasture improvement programme has been conducted so far. Without having any solid empirical survey of actual and potential forage sources and any plan for making the best use of existing ones it is simply wrong to claim that sheep population has reached the limit. We are also losing thousands of jobs that could be generated for harvesting existing feed/fodder resources. Our priorities have not been scientifically scrutinized in terms of making the best use of local resources. Our import figure of feed is huge because we have yet to start really investing in feed plants and we waste huge mass of tree leaves or roadside forage resources or orchards. Our forest resources have yet to be used for the best ends of livestock industry and there is much uncalled. We have yet to really implement large number of steps for better utilization/harvesting of huge potential sources of fodder/feed. We have, for instance, huge areas containing dense vegetation cover inaccessible or restricted for security reasons. We lose enormous mass of vegetation at many potentially harvestable places feed could be used for poultry. Projected figure of grazing pressure assumes large animals go to pastures and are not stall fed. This is not the case today when majority of large animals are stall fed. The truth is that there are underutilized highland pastures though subalpine pastures are under stress due to urbanization and encroachment. We have underutilized orchards which could accommodate growing sheep population for years. Sheep add to soil and vegetation cover by their organic fertilizer. Thus the environmentalist's argument against sheep population is unwarranted as this point is not kept in consideration while making a verdict. The fact is that we are somehow managing our feeding especially green fodder/hay without importing. It shows the present population is not really overstocked for our fodder resources. We have yet to use feed block technology on large scale and many other technologies for making use of unconventional sources to further complement natural sources. This should factor in while calculating stress on fodder resources. We have currently no rendering and other processing plants to convert sheep blood, bones etc. to further complement feed resources. These meals from rendering plants are a useful addition to feed resources. Given around 18 lac animals that are slaughtered annually we can imagine how much could be complemented from mutton industry as a byproduct for feed/fodder resources that are supposedly short. We now discuss one key proposal in some detail that I think has a huge scope if we could give it a kick-start.

Issues for concern: Progress in certain sector raises its own problems that need continuous monitoring. Inheriting a plethora of problems from history the Department had an uphill task of revolutionizing sheep sector. However challenges continue although the efforts to overcome them also are going on. While I have already discussed certain issues of concern the following briefly sums up general picture:

- Lack of infrastructure including deficiency of Sheep Extension centers, manpower, Diagnostic facilities, buildings, shearing units, fencing of Government Farms, etc.
- Manual shearing and lack of desired quality rams for significant percentage of animals.
- Unscientific feeding and lack of control over breeding policy and absence of recording, poor fertility, poor AI, embryo transfer technology and absence of breeding societies and proper selection in
- Lack of industrial sector for proper utilization of animal by-products like wool, skin, hides, etc.
- Conception rate of most Bakarwal and poor farmer owned is very low though no data available on it. This is because of nutritional and transport stress following or on the way back from Alpine pastures. There are no arrangements on the way to house, to rest, to supplement their nutrition.
- Mineral deficiency is a general concern. This is evidenced by seeing body condition of flocks and a host of mineral nutrition related diseases in the field. Complete feed blocks would be quite handy.
- Number of twines is less than 8% which is national average.
- Number of those giving single crops is very less but huge scope.
- Lamb mortalities are a concern.
- Scientific feeding is largely unknown.

Some proposals for change: Here are some of the strategies that, I think, need to be debated as possible route to decrease gap between demand and supply of mutton in Kashmir.

- All those who have big orchards should not be allowed to purchase mutton or animals from market until they agree to rear a few sheep there or give it on lease for this purpose. We must block existing leakage points. The government has much unused unattended land which could be used for rearing small units of sheep.
- Let professional suppliers of elite rams sell ram services to interested farmer. In Rajasthan an elite ram was earning more than Rs 500/service daily as the farmer allowed to use it against payment. This could become a lucrative business here.
- Developing mutton farms in every district without involving any financial implications. This could be done by focusing on one progressive farmer, helping him procure the best animals available, breed them under our supervision and then follow a rigorous selection procedure.
- Increasing money at least five fold for purchase of locally available quality rams and ensuring that none of

the quality animals with good breeding value goes to slaughter at festival days.

- Introducing policies that lead to explosive growth of seed farms. Special incentives for those who develop quality rams in their private farms and instituting Dr Bandey Prize for best breeder in every district.
- We need to make cooperatives functional, integrate and educate farmers regarding how to evolve creative solutions to current working mode that pits one breeder (especially in poultry sector) against another as these have been the real bottlenecks.
- Establishing the long overdue investment wing of the department. This is very important to tap huge current interest in investors in sheep farming and byproduct industries. So far little has been done in terms of attracting big capital for sheep industry. To begin with the department or doctors association or any NGO may today decide to manage a sheep farm or contract with professional farmer for supplying qurbani rams and four animals annually for five years by collecting only 15000 from all members. We should facilitate creation of model cooperative farm/livestock bank so that people could copy it few cooperative dairy/sheep farms.
- Taking steps so that only licensed farmer/persons supply animals at qurbani or for units etc. This will prevent quality animals going to slaughter; help restore trust in people interested in investing in sheep husbandry and lead to speedier development of germplasm.
- Establishing Cooperative farms by pooling livestock of marginal farmers.

Cooperative farms as panacea for multiple Ills: Amongst the most effective and popular schemes currently run by the Department that holds great promise for future also is the Participatory Mode. The secret of its success is partly attributable to it being rooted in our tradition. Here is another idea essentially rooted in tradition that has been adopted in light of current practices and has a great potential to transform sheep sector and improve economy a great deal. Cooperative Farming is community mode of rearing livestock. It involves pooling small units for rearing under one roof or in close vicinity. It employs professional person(s), preferably within the locality, as labour and pays all the contributing farmers as per their contribution in kind or cash. Persons contributing cash only could also be made parties by converting the cash into farm assets or livestock.

Mode of Operation of Cooperative Mutton Bank

- Instead of transactions in cash only the bank owned by cooperative societies, shall accept cash or quality animals and then proceed in the following manner.
- Invest the same for making scientific farms.
- Share the farm produce amongst account holders in kind or cash.
- Keep some fraction of profits for maintenance and extension of branches.
- Use new animals produced by farms for opening up new farms and thus extension of branches.

Cooperative farms as PPP: It is possible to adopt the idea for making it PPP enterprise. Here is how this idea could go on. The dept. shall select a few villages for introducing the idea. It will involve registering all the farmer/farmers of the locality village wise and alloting a special registration card to the respective farmer mentioning the number and worth of animals contributed and perks due to them. The locally appointed two persons, on contract basis, will rear the whole livestock of the village at one place in a shed provided by some breeder on rent or constructed by the dept. Pay dues for these appointed persons, preferably from Choupan/Bakarwaal community, can be raised from the revenues generated from the cooperative farm. One person per hundred or 150 sheep may be the ratio used.

Advantages of cooperative farming for boosting mutton production*:* By virtue of this a big challenge of selection of local animals, pooling diverse genetic resources, registration of all unregistered flocks, culling of less economical animals and efficiency in management and, according to one estimate, almost 100% decrease in required labour force later on. Some land or infrastructure on lease it should allow to be used for this purpose. If this succeeds – and there are almost 100% chances it will succeed – it would be a revolutionary contribution, bigger than the entire milestone so far achieved. It would generate jobs for all unemployed doctors as one doctor would be needed for managing few cooperative dairy/sheep farms which could come up almost everywhere in villages or outskirts of city at least. This will be a great step forward to virtually achieving autonomy or so-called freedom. Economic self sufficiency is the definition of freedom in a globalized world.

CONCLUSION

Approaching towards an answer: *Is* it possible to bring a radical transformation in the current scenario? It is heartening to recall that once upon a time, before 1947, our State exported live sheep? But we had quite a small population and that too with little purchasing power. Meat was consumed mostly on festivals or special days. Today with more purchasing power and stress on environment our challenge is to deliver the maximum possible in the given conditions. There are reasons that believe that we can increase sheep population to some extent by planning to appropriate most of orchards (2 lac out of 2.4 lac hacteres of land may thus be used given our will, as a community and State to be involved in organic farming and reducing imports) for rearing 2-3 sheep/canal without causing any significant stress to either orchards or general environment. These can be reared on orchard produce with existing labour resources that usually are engaged in managing orchards. This would also add organic manure worth tens of crores if we calculate larger environmental costs of chemical fertilizers.

References

Agnihori K and Rajkumar V. “Market Trends in Goat and Sheep Meat: National and International Scenario” in Small Ruminant Productuon in India: Strategies for Enhancing.

Anonymous, 1984. Indian Archaeology. (A Review), 1981-82. 19.

Anonymous. (2004). Directorate of Sheep Husbandry Kashmir division, Government of Jammu and Kashmir. http:/ /jksheephusbandrykashmir.net/sheep.html.

Baba. M. A., Ahanger S. A., Hamadani. A., Rather. M. A., and Shah. M. M. 2020. Tropical Animal Health and

Production. https://doi.org/10.1007/s11250-020-02238-1.

Baseline Survey. (2014). Census of India. Retrieved June 18, 2015, from http://www.censusindia.gov.in/vital_ statistics/BASELINE%20TABLES07062016.pdf.

Devi, S. M., Balachandar, V., Lee, S. I., and Kim, I. H. (2014). An Outline of Meat Consumption in the Indian Population - A Pilot Review, Korean Journal of Food

Science and Animals.34 (4), 507–515.

Dietz, T., Kalof, L., and Frisch, A. S. (1996) The human eco- logy of the vegetarian diet: A bibliography. Hum. Eco. Revi. 2, 181-186.

EARO(Ethiopian Agriculture Research Organization).(1999). Livestock Research Strategy:

Executive Summary. Addis Ababa, Ethiopia.

ISS (Integrated Sample Survey). (2011-12). Department of

Animal Husbandry, Dairying and

Fisheries, Government of India.

Karim, S.A., 2008. Small ruminant production in India.

Satish Serial Pub. House.

Kiple, K. F. (2000) "The question of Paleolithic nutrition and modern diet" in Kiple, K. F. and Ornelas, K. C. (eds.), The Cambridge World History of Food. Cambridge: Cambridge University Press, pp. 1704-1709.

Larsen, C. S. (2000) "Dietary reconstruction and nutritional assessment of past peoples. The bioanthropological record," in Kiple, K. F., and Ornelas, K. C., (eds.), The Cambridge World History of Food. Cambridge, Cambridge UniversityPress, pp. 13-34.

Lawrence, W.R., 1895. The valley of Kashmir. H. Frowde.

Livestock Census reports of India from 1951 to 2019.

Livestock Census. (2012). Ministry of Animal Husbandry, Dairying and Fisheries, Govt. of India, New Delhi.

Livestock Census. (2019). Ministry of Animal Husbandry, Dairying and Fisheries, Govt. of India, New Delhi.

Mirza Saif-ud-Din, Akhbarat, Vol. I, ff.18-19.

Rather SA, Masoodi FA, Akhter R, Gani A, Wani SM and Malik AH. Xanthan gum as a fat replacer in goshtabada traditional meat product of India: effects on quality and oxidative stability. J Food Sci Technol 2015;52:8104-12.

Rather, M. A., Magray, S., Ahanger, S. A., Baba. M. A., Shah . M. M., Rather . T. A., Farooq . Y., &AAbbas, Q. (2019 c). Effect of Some Non-genetic Factors and Fec-B Gene Introgression on Performance Traits of Kashmir Merino Sheep, 8(08), 444–449.

Rather, M., Shanaz, S., Ganai, N., Baba, M., Hamadani, A., Ahmad, M., & Ahmad, T. (2019a). Genetic, Phenotypic and Environmental Trends for Production and Reproduction Traits in Kashmir Merino Sheep. International Journal of Livestock Research, 9(12), 73-78. doi: 10.5455/ijlr.20190510100655

Rather, M.A. (2019b). Genetic evaluation of Kashmir Merino Sheep at organized farms. (M.V.Sc. thesis. Division of Animal Genetics and Breeding Faculty of Veterinary Science and Animal Husbandry, Sher-e-Kashmir University of Agricultural Sciences & Technology of Kashmir).Samoon AH and Sharma N. Studies on processing and refrigerated storage of 'Rista'. Meat Science 1994;37:347-68.

SHD (Department of Sheep Husbandry Department).

(2016). Government of Jammu and Kashmir.

Stanford, C. and Bunn, H. T. (eds.) (2001) Meat-Eating and Human Evolution. New York: Oxford University Press.

Tenth Five Year Plan. (2002). Planning Commission, Government of India, 2: 316-363. Retrieved June 18, 2015, from http://www.fao.org/docrep/009/ah221e/ AH221E13.htm

Wing, E. S. (2000) "Animals used for food in the past: As seen by their remains excavated from archeological sites," in. Kiple, K. F and Ornelas K. C. (eds.), the Cambridge World History of Food. Cambridge, Cambridge University Press, pp. 51-58.

How to cite this article:

Muhammad Maroof Shah *et al* (2020) 'Mutton Production, Demand and Supply in Jammu and Kashmir and its Augmentation', *International Journal of Current Advanced Research,* 09(05), pp. 22095-22102.
DOI: http://dx.doi.org/10.24327/ijcar.2020. 22102.4355

****