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Original Research

Present Status, Scope and Opportunities of Livestock and Poultry Production in Bay Islands India

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Abstract

The total livestock population on the islands was 1.8 lakh including crossbred. The total milk production was more than 25 lakh liters in year 2013-14 and per capita availability at Island level was 185 ml/day. The average per day yield was about 1.5 liters for cows and 1.5-2.0 liters for buffaloes. The per capita meat availability was one about one kg/annum, and eggs 168 number per annum. The majority of livestock and poultry farmers have stated livestock is an integral part of their livelihood. The total poultry population increased from 0.80to 1.11 million from 1997 to 2013.The major challenges in maintaining livestock and poultry population were low productivity, deficit in fodder, feeds and basic infrastructures, geographic isolation and climatic risks. However, there is potential of introduction of improved livestock, pig and poultry species including fodders. However, climatic and socio-economic constraints are hindrance. The adequate scientific interventions and need based extension programme can weed out these challenges.

Keywords: Challenges, Constraints, Livestock, Prospects, Scope

Introduction

Livestock and poultry not only provides food and income from milk, eggs, meat, wool, hide and draught animal power, but also provide social status, insurance and cultural values, employment especially for women. While this system supports larger populations than any grazing system, only 10 per cent of the world population is related to this system. Fifty-one per cent of the population involved is in Asia, mainly India, and 24 per cent in the West Asia and North Africa region. The increasing demand for livestock products continues to be a key opportunity for poverty reduction and economic growth, although the evidence of the last 10 years suggests that only a few countries have taken advantage of this opportunity effectively (Dijkman, 2009). Smallholders currently are critical to food security for the vast majority of the poor, and this role is not likely to change significantly in the future. There are many options to promote the development of sustainable and profitable smallholder livestock production for sustained innovation in national and global livestock systems. Increasing regulation to govern contracts along food commodity chains, including acceptance and guarantee of collective rights, community control, building social protection, and strengthening links to urban areas (Birthal *et al*., 2004 & 2006). Small and marginal farmers and landless labourer with holding size of 1-3 cattle/buffalo and some sheep per households in India mostly do livestock rearing. Medium to large herds of cattle, buffaloes, goats and poultry also exist, mainly for supply of milk, meat and eggs. India continues to be the largest producer of milk (13.1%) in the world since 1998 and has the largest bovine population. Milk production in India during 1950-51 to 2016-17, has increased with recorded growth of 6.26 %. The per capita availability of milk in the country was 130 gram per day during 1950-51 and has been increased to more than 330 gram per day against the world average of 293.7 grams. Total egg production in the country has been reported as 88.1 billion, showing very high growth rate more than 12%.

As per Government of India statistics for the fiscal year 2017-18, the average milk yield of indigenous cattle, crossbred cattle and water buffaloes were 2.5, 7.2 and 5.2 kg per day respectively and it is significantly less than 22 and 28 kg per day milk yield in U.K. and United States, respectively DAH&F, Govt. of India, reports (2017). According to dairy industry estimates, by 2020 India may face acute shortage in dry fodder, green fodder and concentrates to the extent of 11, 35 and 45 per cent, respectively. Moreover, use of compound cattle feed in India is only 8-10 million metric tons against the total feed requirement of around 80 million metric tons (Vijay and Zimmerman, 2017). Livestock products contribute 17 per cent to kilocalorie consumption and 33 per cent to protein consumption globally. Livestock activity facilitates many environmental benefits; however, the tropical livestock systems can also damage the environments, water and land resources, produce greenhouse gases and partly responsible for global warming (Steinfeld *et al*., 2006). Smallholding livestock keepers dominate crop–livestock system, with livestock playing the dominate role in the highly diversified system that typically combine crops and livestock with off-farm activities. Livestock contributes about 50% of the income of poor households in crop–livestock systems in some agriculture-based states of India (Deshingkar *et al.*, 2008; Cocca *et al.*, 2012; Rangnekar, 2006). Besides generating income livestock rearing also provide nutritional security and help the rural household to overcome poverty (Das *et al.*, 2020). Livestock sector contributes to GDP to the considerable extent in India. However, this sector also faces several challenges. Unavailability of green fodder throughout the year, high cost of feed and fodder, poor conception rate through artificial insemination and poor knowledge about feeding and healthcare were the major constraints perceived by the dairy farmers (Harisha *et al.*, 2019).

The tropical islands proven to several challenges like climate change, poor infrastructure and lack of accessibility of basic needs particularly for livestock and A & N Islands is not an exception. Islanders possessed very good Indigenous Traditional Knowledge (ITKs) for livestock, poultry and fishery management and these were well documented by Sethi *et al.* (2011). The livestock and poultry related challenges in tropical areas are deficit in feeds & fodder, poor veterinary infrastructure, insufficient veterinary staff, local breeds, inferior germplasm poor resource availability and environment limitation Minhaj *et al.* (2019), Jayakumar *et al.* (2013); Chand *et al.* (2018a). Despite of these challenges islanders keep animals and drive their livelihood. There are limited studies focusing on livestock management, identification of challenges and opportunities offered by livestock sector for tropical islands. In view of above background, present study was undertaken with the specific objectives, 1) to understand the status of livestock and poultry production system, 2) to enumerate the production challenges for livestock sector in these islands, 3) to analyze the demand and supply of inputs/output, 4) finally to draw logical conclusions for advocating policy recommendation for the betterment of livestock farming.

Materials and Methods

Data and Data Source

This study was conducted based on primary and secondary information collected from sources of A & N Islands.The primary information from the 120 livestock owners were collected to understand the challenges they face in livestock and poultry production. Since majority of livestock, owners are small and marginal they may face higher degree of risks and management challenges. Therefore, we hypothesized that lower the herd size higher the risks. We have tried to work out the losses in terms of livestock, poultry, seed and planting materials and other agriculture infrastructure and equipment damaged by extreme climatic event (Tsunami, 26 December 2004). Since extreme climate, events are common in these islands and always have the uncertainty and challenges before the livestock and poultry farmers. Therefore, we tried to understand the damage due to mega climatic event by working out the damage in terms of agriculture including animal husbandry, poultry and fishery sector of Islands. We have collected the primary information on socio economic features of livestock owners, herd size, income from livestock sector, feeds and fodder produced locally demand and supply, nutrients supplemented by livestock and poultry. The animal husbandry management infrastructure and market information were also collected and these basic information were analyzed to draw the logical conclusions.

Analytical Framework

The Compound Annual Growth Rate (CAGR) for Number of livestock infrastructure from the period of 1980 to 2015-16 was estimated using the following model.

$$Y = ab^t$$

Where,

y = No. of particular livestock infrastructure
a = intercept
b = regression coefficient of Y on time t

$$\text{ACGR in (\%)} = \text{antilog } (b - 1) * 100$$

The instability was measured for different periods by estimating the co-efficient of variation of number of livestock infrastructure increased over the period of time:

$$CV = \frac{SD}{Mean} * 100$$

Where,

CV = Co-efficient of variation,
SD = Standard deviation

Measuring the Extent of Seriousness of Challenges in Livestock Production

We have used Likert type scale to measure the perception of livestock and poultry owners on challenges and constraints faced by them. The items measuring in *Liket* scale studied in this project and these were treated as continues variable Lien *et al. (*2007). The scale was used as Not serious=1, somewhat not serious =2, neutral=3, somewhat serious =4 and very serious =5 (Khan *et al.,* 2014; Chand *et al.,* 2019b) for this study. The standard deviation and average value of score was calculated and interpreted in the subsequent section of this paper.

Assessment of Gaps Between Demand and Supply of Demand for Feeds and Fodder

The demand for feed and fodders required for different age group of animals were calculated based on the recommendation of animal nutrition division, ICAR- NDRI. The local supply was assessed based on the total area

under fodder production, by products of the cereals and fodder brought from forest areas, and gaps were worked out as. The gaps in demand and supply of fodder and feeds was worked out as Gap = Total Demand-Total Supply and similarly the demand and local supply of milk, meat, fish and eggs was worked out using per capita ICMR recommendations for human consumption. We have used the census data 2011 for this purpose. We have also estimated the human nutrients supplemented by livestock sector and gaps due to short supply at islands level. The contribution of livestock sector to the nutrients to the soil health management were also worked out and presented in this paper.

Results and Discussion

Background of Study Area

India is one of the 12-mega biodiversity centers in the world and Andaman and Nicobar (A&N) Islands is one among them. These groups of islands are the largest archipelago system in the Bay of Bengal, consisting of 576 islands, situated between 6˚45' N to 13˚ 41' N latitude and 92˚ 12'E to 93˚ 57' E longitude. The total geographical area is around 8,249 km2 with a coastline of 1,962 km. The Andaman and Nicobar Islands is divided into three districts namely South Andaman, North & Middle (N&M) Andaman and Nicobar group of islands and four subdivisions with 11 Tehsils and 204 revenue villages Census (2011). The 90 per cent of the land area of the A&N group of islands is designated as a reserve or protected forest, of which 36 per cent is under tribal reserve. The Exclusive Economic Zone of the country has an area of 2.02 million sq.km comprising 0.86 million sq.km of the west coast, 0.56 million sq.km of the east coast and 0.6 million km^2 around the Andaman and Nicobar Islands. The land distribution system in general allowed each settler 4.4 ha of land consisting of two ha of paddy land, two ha of hilly land and 0.4 ha land for the homestead. Mono cropping of paddy and haphazard planting of coconut, areca nut and few fruit trees in the backyard are the usual practices in the agricultural sector. Amongst the field crops, rice was the major crop occupying about 7685.47 ha with productivity of about 2.20 t/ha and cropping intensity was dismally low at 105 per cent. The overall growth rate of gross state domestic product remains around 6 per cent during the last decade (2005 to 2015). Sectorial contribution indicated that service sector, which is predominated has contributed about 57 per cent and primary sector contributes 31.76 per cent. However, tertiary sector also contributes to the extent of about four per cent, but there are not much manufacturing and processing industries existed in these islands. Hence, the livestock sector is playing a greater role in improving and supplementing the farm income of Islanders. It is important to note that due to earthquake followed by the Tsunami (26 Dec 2004) has significantly damaged the agricultural and livestock sector 6000 ha.

The total population is around 3.8 lakh, where in 22% has been occupied by Nicobar Islands and supports about 10% population out of which 79% people belong to ST and rest migrating from other part of the country. The literacy rate (86.27%) was higher than national average. The total number of livestock found to be higher in N & M Andaman district followed by South Andaman (Table 1). However, per capita possession of livestock was more for Nicobar district. The possible reasons may be less human population exists and almost every household maintains pigs, goat and poultry in the district, elsewhere in the other two districts had more number of large ruminants (cattle, buffaloes and goats). The annual milk production was about 157.02 Metric Tons (MT) which is produced in two districts (North & Middle Andaman and South Andaman) more than 95% of the total milk production. The per capita availability of milk for the islands 111.32 gm/day and this is lower than the national average (330 gm/day). Similarly, South Andaman alone also produced around 55% of the total meat (339MT). However, the islands produce milk and meat locally, but still, they have to import substantial quantities from the mainland to satisfy the domestic demand. About 16.2 lakh liter of milk, 14.5 MT of meat and 11.65 lakh of poultry (number) are being imported from different part of the country. However, in terms of egg availability, the island achieved self-sufficiency. In spite of local production these islands heavily dependents on import of food and nonfood items particularly cereals, pulses and sugar. The livestock products like milk powder, ghee, paneer, ice-cream etc., are also imported from mainland.

Table 1: Socio economic features of A & N Islands

S. No.	Particulars	A & N Islands	Name of District		
			South Andaman	North & Middle	Nicobar
1	Total geographical area (sq km)	8249	3106	3302	1841
1.1	Per capita Geographical area (ha)	2.17	1.31	3.13	5
2	Total forest area (sqkm.)	6629	2673	2956	1542
2.2	Per capita forest area (ha.)	1.74	1.13	2.8	4.19
3	Total population (0,000 numbers)	37.99	23.76	10.56	3.68
4	Sex ratio	966	961	977	961
5	Literacy rate (%)	86.27	88.49	84.25	77.5
6	SC/ST population (%)	7.05	11.24	10.29	78.51
7	Total number of land holdings (000)	11.35	5.07	5.85	0.67
8	Operational holdings in ha (000)	22.69	7.96	13.09	1.64
9	Total number of livestock (0,000)	17.56	5.53	7.48	4.37
9.1	Per capita livestock	0.46	0.23	7.09	1.18
10	Total milk production (00MT/annum)	157.02	75.52	74.9	6.6
10.1	Per capita/day milk availability (ml)	111.32	87.08	194.32	49.14
11	Total meat production (0,000 kg/annum)	33.88	18.51	12.26	3.12
11.1	Per capita availability of meat (kg/annum)	0.89	0.78	1.16	0.85
12	Total eggs production (00,000 numbers)	989.55	525.915	372.93	90.712
12.1	Per capita eggs availability (number/annum)	168.17	156.11	218.98	100.3
13	Total milk imported (0,000 litre/annum)	162	95	-	67
13.1	Meat imported (0,000Kg/annum)	14.5	10	-	4.5
14	Total number. poultry (00,000 numbers)	11.65	6.65	3.54	0.92
14.1	Per capita number of poultry	2.58	2.39	3.35	1.54

Source: Basic statistics, 2016

Livestock Species Diversity in Andaman & Nicobar Islands

The livestock farming depends on the success of agriculture and thrives in tandem with agriculture. The tropical islands have suffered severely due to low intensity of crop production and several other location specific problems like poor germplasm, unavailability of good quality forage, higher cost of feed, unfavorable environment, animal health problems, and transportation and marketing. However, recently livestock and poultry farming in these islands has gained a significant momentum and emerged as one of the major sources of self-employment, subsidiary income and livelihood supports. The bovine found in the A & N Islands *i.e., Jangligai*, Trinket cattle, Jersey & Holstein Friesian or cross bred, Barren goat, *Teressa goat,* Andaman goat, Malabari goat, *Nicobari pig,* Andaman wild pig etc. These species are having unique germplasm and can sustain in challenged environment. Therefore, need to be conserved and protected for future generation. However, some of the species have adaptation in the tropical condition and some are even disease resistant, but some of the species are at the state of extinction and endangered. Hence, Government policy and research efforts should also be made towards in-situ conservation of livestock species, Ahlawat, 2001, Rai *et al.* (2001), Kundu *et al.* (2014).

Poultry Diversity

Long period of isolation from mainland has brought various genotypic and phenotypic variations in the Island's avifauna. Moreover, settlers who came from the mainland also responsible for genotypic and phenotypic variations. A few indigenous birds such as *Naked Neck, Red jungle, Nicobari fowl and Frizzel fowl* are found at these Islands. To maintain their genetic identity due to their habitat in the isolated Islands, efforts are needed. The non-descript birds found in these islands seems to be the crosses of the following breeds like *Australorp, Sussex, Rhod Island Red, New Hampshire, Plymouth Rock, White Leghorn, Aseel, Naked Neck, Nicobari, Frizzle* and many other non-

descript desi birds (Ahlawat, 2001). Since, A&N islands attained self-sufficiency in poultry production, the efforts have to be made to increase the food processing enterprises at islands level.

Challenge of Basic Livestock Infrastructure Development and Management

The data on infrastructures, related to livestock and poultry health and management are existing in these islands were collected and Compound Annual Growth Rate (CAGR) was calculated taking into account of data from 1980-81 to 2017-18 (Table 2). From the table it revealed that a coefficient of variation varies from 8% to 170%, indicating higher variability in the infrastructure created during 1980-81-2017-18. However, CAGR was highest for AI centers developed followed by growth in veterinary dispensaries. The negative growth rate was observed in the case of disease investigation laboratories, Government owned poultry farms, cattle farms, training centers and quarantine units etc. Since, demand for livestock products is increasing day by day, sufficient support in the form of policy interventions for improvement of livestock and poultry in these islands need to be emphasized so that these islands become self-sufficient in livestock production. Therefore, better livestock services in terms of market infrastructure, veterinary infrastructure and extension support etc. need to be developed to have sustainable livestock production.

Table 2: Growth of veterinary facilities in Andaman and Nicobar Islands

S. No.	Item (in numbers)	1980-81	2017-18	CAGR (%)	CV (%)
1	Veterinary hospital	2	9	10.83	28.9
2	Disease investigation laboratory	7	1	-15.13	83.59
3	Artificial insemination centre	1	21	40.31	93.7
4	Artificial insemination sub-center	2	37	35.82	54.15
5	Key village unit	12	16	1.86	8.19
6	Key village block	7	1	-21.02	116.1
7	Veterinary dispensaries	2	12	31.06	111.41
8	Mobile dispensary	2	12	28.51	69.41
9	Government poultry farm	27	17	-10.16	61.54
10	Training centre	1	1	-12.44	80.55
11	Cattle farm	1	8	30.29	109.07
12	Fodder farm & plots development	1	4	35.4	170.35
13	Quarantine unit	1	1	-8.42	67.19
14	Piggery & goat demonstration unit	1	5	27.67	64.42
15	Bio gas plant	2	1	-9.55	78.68
16	Number of veterinary doctors	0	44	315.36	105.42
17	Number of other veterinary staff	115	447	415.89	105.56

Source: Basic statistics, Directorate of economics and statistics, A& N Islands, various issues

Challenges of Meeting Local Demand and Supply of Livestock Products

The demand and supply at local level was worked out based on 2011 census data. The population growth rate was used to extrapolate the population for base year as 2000-01 and demand and supply projection were made for 2021 and 2031. The gap between projected production and consumption for livestock products for 2013-14, 2020-21 and 2030-31 are presented in Table 3. The baseline data for the year 2000-01 revealed that the actual production of milk in the island was deficit by 24165 tons to meet the local demand. Therefore, these islands import milk and milk products from mainland. Similarly, the mutton production at Island was also deficit by 912 tons, which may go up to 1030 tons in 2020-21. This indicates that there is a huge gap in livestock products i.e., milk and meat and to improve the scenario requires huge investment to meet the local demand. However, in case of chicken there is a gap of 368 tons between supply and demand and supply will take over demand in 2021 and there will be surplus production of chicken of the tune of 2931 tons in 2031 (Fig. 1). Therefore, the administration has to dovetail proper planning to create necessary infrastructure for chicken processing, storage, transportation and marketing for optimal utilization of the surplus production, which will generate gainful employment to the local youth. Similarly, at present

eggs, production is more than their actual demand and hence for this commodity arrangements have to be made to export eggs from the islands.

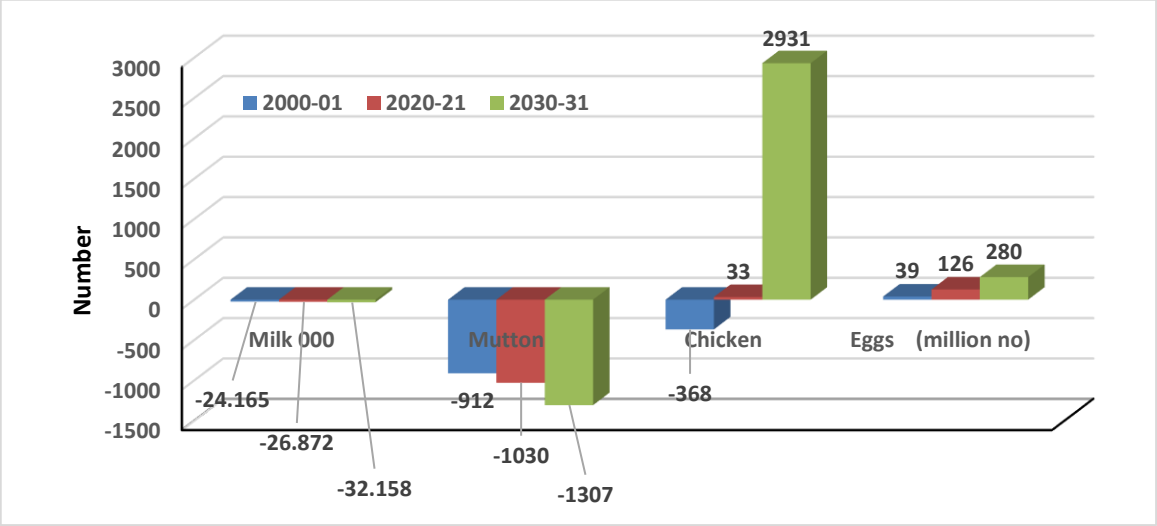

Figure 1: Gaps in demand and supply of livestock and poultry production

Feeds and Fodder Demand and Supply Challenges for Livestock

The requirements, availability and deficit of feed and fodder in A & N Islands has been depicted in the Fig. 2. It was observed that green fodder was deficit about 99%, followed by concentrates (97%) and dry fodder (52 %). The non-availability of feed and fodder are the major challenge to sustain the livestock production in these islands. Due to heavy rains for about eight months, green fodder cultivation is difficult and storage a big challenge. The only option remains with the islanders is the controlled grazing and utilization of fellow and uncultivated barren lands. Thus, livestock production can only be sustained if these challenges are minimized. Hence, local administration and line department need to work together by adopting of a holistic approach to minimize the ill effects of challenges faced by the livestock and poultry owner's particularly small and marginal farmers.

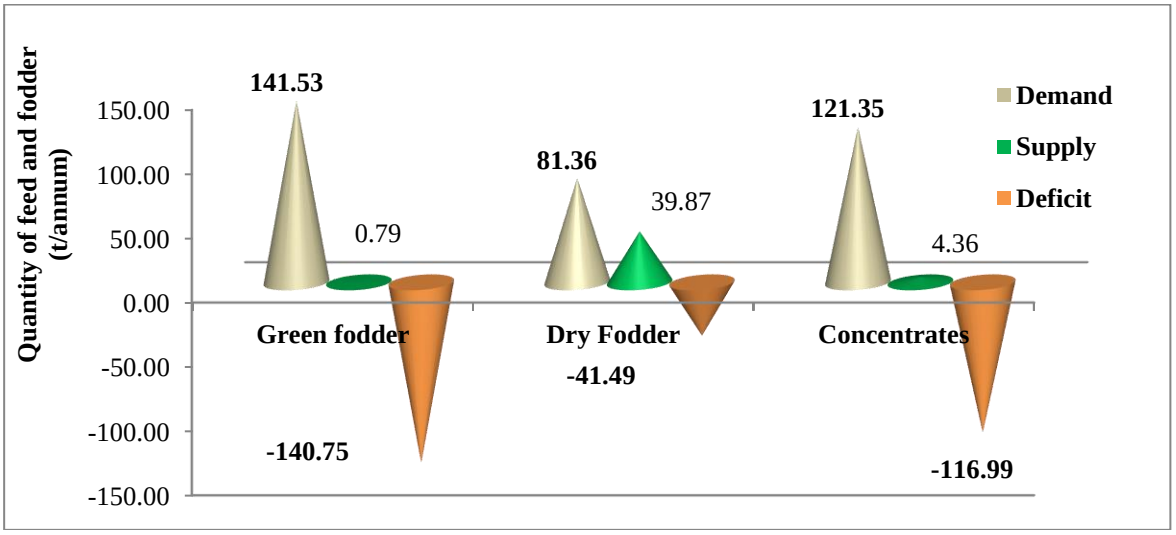

Figure 2: Demand and supply gaps of feed and fodder (000 tonnes/annum)

Extreme Climatic Challenges for Islands and Effect on Livestock and Poultry

The data related damage on livestock and poultry due to tsunami for Andaman and Nicobar Islands have been summarized in the Table 3. The tsunami damage in terms of loss of animal, standing crops, farm inputs and equipment was about Rs. 40,000/-per farmer. The loss was not uniform and even was more for severely affected islands *i.e.*, Little Andaman, Trinket, Little Nicobar, and followed by other islands. The Nicobar groups of islands

are very rich in terms of having pigs, goats and poultry as almost each family reared these animals in their homestead. However, in these islands, the tsunami caused significant damage to the animal sector. The islands like *Car Nicobar, Trinket, Chora, Kamorta* etc. had losses in the range of Rs. 30,000 to Rs. 65,000/- per family in terms of pig alone. Moreover, bovine loss was also found to be higher in the case of Trinket Island. Though South and N & M Andaman districts had significant losses in terms of livestock population but their losses was much higher for agriculture crops, equipment and other infrastructures. This indicated that A&N islands always have climatic related challenges (as evident from the tsunami loss extreme event Chand *et al*. (2013c) and need special policy to address the risks and challenges for sustainable livestock production. Therefore, climatic risks a version mechanism need to be developed through insurance, credit supply and subsidies supports.

Table 3: Loss of livestock and farm assets due to extreme events (*Tsunami*)

Islands	Affected farmers	Loss of livestock and agriculture resources per family due to tsunami/earthquake (Rs.)											Average loss per family
		Bovine (00)	Goat	Pigs	Poultry Birds	Planting Material	Fertilizer (Rs)	Farm implements	Cereals	Vegetable crops	Coconut & arecanut Plantations	Other items	
South Andaman	635	10715	5442	658	1196	3523	199	10521	12137	698	24542	1917	40989
Little Andaman	779	27974	8075	3544	643	4718	267	14090	16253	935	32867	2567	54892
Car Nicobar	2408	7711	12292	30076	480	3746	212	11188	12906	743	26098	2039	43587
Chowra	328	0	222	30357	545	2016	114	6021	6945	400	14044	1097	23456
Teressa	382	733	19106	49453	290	1852	105	5531	6380	367	12902	1008	21548
Katchal	317	23866	11743	19354	602	1366	77	4080	4706	271	9517	743	15894
Nancowry	137	1567	1267	4244	131	1538	87	4592	5298	305	10713	837	17892
Kamorta	156	36840	9311	17085	500	1432	81	4276	4932	284	9974	779	16658
Trinket	83	174659	9527	55573	1231	5663	320	16914	19511	1123	39454	3082	65894
L. Nicobar	82	0	0	15605	1023	3666	207	10948	12629	727	25539	1995	42653
Campbell bay	761	65623	2855	2851	345	2490	141	7435	8577	494	17344	1355	28967
Kondul	34	0	0	2008	167	1630	92	4868	5615	323	11355	887	18965
Pilomillow	25	575	1437	13735	321	1235	70	3688	4254	245	8602	672	14367
Bambooka	22	3925	15995	39547	0	1856	105	5541	6392	368	12927	1010	21589
Mayabun-der	39	567	1588	28	188	950	54	2838	337506	19422	682500	53313	11058
Overall	6188	20286	8965	19906	560	3232	183	9652	13240	762	26774	2092	37602

Calculation based on sample survey made during 2013-14 and based on the Digal (2005)

Farmer's Perception on Challenges for Livestock Production System

We have collected the informaton from the 120 stakeholders and same were analysed and presented in Table 4. The score was calculated of sampled households who have participated in survey and their opinion was measured on five point Likert type Scale. As per the procedure, if standard deviation (SD) is more than one against a respective challenge, more disparity among the farmers opinion is assumed to be existed. These Islands are far away from mainland and the input supplies are mainly depends on mainland, which is most often uncertain. It was observed that almost all the fourteen challenges reported have got the scale value more than three except price fluctuation and poor information system. The SD was found to be me more than one for production challenge indicating high variability in the perception of the respondents. There were not much variations in the opinion across the different categories of farmers. However, small livestock and poultry farmers consider that fodder and feeds scarcity, extreme climate and poor resource are the serious challenges for the island farmers. Similar opinion was also recorded for medium and large livestock farmers. Therefore, it is inferred that production related challenges need to be considered while framing the livestock and poultry policy for these islands so that this sector become the viable for these islands.

Table 4: Farmers perceptions on challenges faced

S. No.	Production challenges	Small		Medium		Large	
		Score	SD	Score	SD	Score	SD
1	Feeds and fodder scarcity	4.19	1.01	3.53	0.76	4.11	0.72
2	Extreme climatic events	4.65	1.72	4.81	1.25	4.17	0.86
3	Transportation challenge	4.54	0.89	3.78	0.89	4.71	1.25
4	Poor resource base of the livestock owners	3.87	1.25	4.86	1.25	3.89	0.71
6	Limited accessibility for livestock goods & services	3.45	0.71	3.56	0.71	3.55	0.83
7	Lack of government support	3.42	0.83	2.11	0.83	3.56	0.89
8	High yielding bred not available	3.54	0.89	3.51	0.89	3.65	0.87
9	Disease incidences high	4.86	0.84	4.05	0.73	4.65	0.85
10	Poor health facilities for livestock and poultry	4.54	0.89	3.78	0.89	4.71	1.25
11	Modern technology exposure lacking	3.87	1.25	4.86	1.25	3.89	0.71
12	Poor market infrastructure	3.45	0.71	3.56	0.71	3.55	0.83
13	Poor information system	3.42	0.83	2.11	0.83	3.56	0.89
14	Price fluctuations	2.54	0.89	2.51	0.89	2.65	0.87

Opportunities Offered by Livestock Sector to Maintain Soil Health

The data on farmyard manure was collected by each individual farmer form livestock and poultry from the sample households and extrapolated that with total number of animal/birds existed in the Islands is illustrated in the Table 5. It was observed that cattle produce around 2.3 lakh tones of FYM amounting to about Rs. 5000 lakh per annum while buffaloes produce around 0.40 lakh tonne having the value of Rs. 1000 lakh, while contributions of goat, pig and poultry were very meager to the entire islands. These estimates are of entire livestock existing in the Islands. This is the tangible benefit of rearing animals, which has contributed in enriching the soil. These FYM supply necessary nutrients to the soil and improve the per unit returns from the cultivable land for the islanders by reducing the input cost. The total monitory benefits in terms of nutrients contribution were >83%from cattle alone and about 17% from buffaloes. However, contributions from other livestock and poultry are less than 2% and this may be due to the fact that the FYM produced by small ruminants are not collected as such since these animals are scavenging type, loitering in the back yard and enriching the soil directly. Thus, optimum use of FYM can significantly reduce the use of chemicals and fertilizers in the crop production. Chand *et al.* (2019d) study revealed that Andaman and Nicobar Islands farmers supplement organic fertilizer along with inorganic fertilizers.

Table 5: Contribution of livestock to soil health building

Livestock Breed	Total No. Animals	Manure production in (000 tonnes)/year	Value in (Rs. Lakh /year)
Cattle	49,364	234.43	5,000.44
Buffaloes	10,091	40.08	1,000.21
Goat	66,721	0.22	0.04
Pig	47,730	0.87	0.19
Poultry	9,78,565	0.04	0.03
Total value (Rs.)			6,000.91

Opportunities of Supplement Income, Employment and Nutrition to Livestock Farmers

The livestock sector contribute largely to the food items in India and Andaman is not an exception. Therefore, this analysis of demand and supply was attempted and it was found that these islands are self-sufficient in meat, eggs, fish and vegetables. While most of the cereals, pulses fruits, milk and milk products are imported from the mainland. However, current trend in tourist arrival more than 4.0 lakh, basic statistics; (2018-19) has been increasing, will be requiring more food items and going to widen the gap between local supply and demand. The analysis revealed that

major items produced locally could contribute only 1136 K. Calories and 58 gm protein per capita per day. The import food items contribute rest of the nutrient's requirement. The contribution of cereals from local production is about 40% k. calorie and 35% protein. The meat and fish contribute about 15% to the energy and these items are surplus. The fat requirement mostly met from non-vegetarian sources. Therefore, livestock sector contributes to the food security of these islands. Hence, local production of food and nonfood items is essential and the use of modern technologies may be directed for higher local production. However, agriculture resource and infrastructure are limited in these islands. Kumar *et al.* (2009) made Similar, analysis for India. Apart from energy, proteins and fat contribution from livestock sector, this sector also provides employment and supplements the considerable income to the livestock keepers. Therefore, livestock sector for tropical islands is very important and it conserves the biodiversity in terms of conserving local germplasm in-situ (Table 6).

Table 6: Contribution to the energy and protein by different sectors

Commodities	Contribution of different source (Per capita)					
	Domestic production		From Import		Exported	
	Kcal.	Protein (gm)	Kcal.	Protein (gm)	Kcal.	Protein (gm)
Cereals	185.8	4.2	508.2	15.5	0	0
Pulses	4.9	0.3	0	0	0	1.5
Oilseeds	7.1	0.1	2.6	0	3.8	0.2
Vegetables	135.4	3.9	16.1	1.1	0.4	0.1
Fruits	198.9	2.9	8.3	0.2	82.6	0.1
Livestock	136.3	8.4	138.6	0	18.1	7.1
Fish	354	37.8	37.9	4.1	125.2	12.9
Sugar	112.2	0	132.4	0	0	0
Total	1134.6	57.6	844.1	20.8	230.1	21.8

Conclusion and Policy Implications

Three quarters of poor people in developing countries live in rural areas and smallholding livestock keepers represent around 20% of the world population. The livestock industry therefore has a great role in tropical economy for nutritional security and income generation. In the present study, we have seen that livestock and poultry farming can play significant role in the enhancement of income and as a source of employment generation especially for the small holders. In tropical islands of India, livestock contribute to soil health building and improvements. Both milk and meat production are deficit and if necessary, intervention not taken the crises may worsen in future. The major challenged of livestock production like deficiency in fodder, feeds, lack sufficient infrastructure and market and hence necessary intervention with suitable policy supported can play crucial role in productivity enhancement for the livestock sector. Therefore, necessary steps should be taken for conservation and protection of unique livestock germplasm of these islands.

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Conflict of Interests

There is no conflict of interest.

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