
CHAPTER 1 INTRODUCTION

History of Earth is replete with the examples of cataclysmic changes leading to changes in the flora and fauna. Ever since the human being arrived on planet earth, it is facing the twin burden of influence of human activity on environment on one side and climate change on the other side as a result of accelerated human activity. Being a thinking species, the human being has been living in contrived environment avoiding to a very large extent the harsh realities of natural environment that other species are facing in the world. This in turn ultimately has led to increase in population and change from the traditional low inputs and low outputs in agriculture to commercial agriculture with high inputs and high outputs. Rapid erosion of crop and livestock diversity has resulted in the loss of genetic diversity on which the crop development and livestock development is based.

1.1 Agro-ecosystem: It consists of plant and animal communities and their environmental functioning as an ecological unit in a given environment and it is strongly influenced and maintained by agricultural management activities. Sustainable agricultural system is a reflection of stability of genetic species, ecosystem levels in agro-biodiversity and socio-economic interaction between farming system and biodiversity.

1.2 Status of agriculture biodiversity: The locally diverse food production systems through agriculture activities are under threat and it is leading to decline in agriculture biodiversity. More than 90% of crop varieties have disappeared from farmers land and half of the domestically bred animals have been lost. Agrobiodiversity is distributed in 8 diverse phytogeographical regions and 15 agroecological regions in India. These regions possess unique gene pools comprising of landraces, primitive forms and wild relatives of livestock and cultivated crops.

1.3 Status of Livestock Diversity: Livestock production systems in the country can broadly be described under four categories: pastoral, forest-based, mixed crop-livestock and industrial/commercial production systems. Mixed crop-livestock farming, forest-based and pastoralism are common production systems found across the country.

Majority of livestock representing different climatic conditions and habitats of the country is having substantial economic, social and ecological role by its contribution to the conservation of environment. India occupies a pre-eminent position with respect to animal genetic resources with 26 breeds of cattle, 8 breeds of buffalo, 42 breeds of sheep, 20 breeds of goat, 8 breeds of camel, 6 breeds of horse, a few types of pigs and 18 breeds of poultry along with species like yak, mithun, geese and duck. 26 Indian breeds of native cattle have been accredited.

There have been dramatic changes in the population and composition of livestock over the past five decades. While the total population and density of livestock has increased over a period of time, the number of livestock kept by each rural household has decreased and there was drastic decline of bullocks during 1980's. There was decrease in the share of farm animals in power supply from 71% in 1961 to less than 23% in 1991. The 59th round of the National Sample Survey Organization (NSSO) have reported that working cattle in rural areas decreased by 25% between 1991-92 and 2002-03. There has been a corresponding shift in the composition of bovine population from cattle to buffalos.

According to NSSO 54th round, a mere 56% of the households have reported the ownership of at least one livestock in 1998-99. Change in livestock population and composition has shown variation across different landholding categories with the decline in livestock holding being sharpest amongst landless households. Surprisingly only 15-20% of households own the sheep and the goat. Limited livestock ownership amongst the poor and landless households might further reduce their stakes in common property/natural resources, which is not only iniquitous but also reduces their coping ability particularly in vulnerable habitats.

This shift in livestock composition and ownership pattern has not happened ‘naturally’ but as a response to several developmental policies made by the government over the years. Land reforms often translated into distribution of public grazing lands, even as the landlords continued to possess fertile lands. The landless were given the poor quality land and the villages have lost the common grazing land. Shrinking Community Property Rights pushed more and more livestock into the forest areas. During the post-independence period, restrictive forest policies continued to keep the livestock out of forests. Forestry and wasteland plantation programmes have further reduced the grazing area.

Simultaneously, the green revolution in agriculture has directly impacted the livestock economy in extremely negative ways-mechanization has replaced bullock power; hybrid mono-crops have resulted in reduced stalk size, diversity and quality of crop-residue, chemicals and pesticides have polluted the environment, thereby affecting the health of humans, animals and plants. Underlying all this, are deeply held biases against India’s indigenous livestock wealth, which originated during the colonial period and continued to be held sacrosanct by many policy makers.

1.4 Economic status of Livestock population: India has the world’s largest population of livestock (485 million), accounting for over 55% and 16% of the world’s buffalo and cattle population respectively (the world’s largest bovine population). It ranks second in goat population, third in sheep and camel population and seventh in poultry population in the world. During the year 2004-05 India was globally the largest producer of milk with an annual production of 91 million tonnes. In the same year it recorded the production of 45.2 billion eggs (seventh in the world), 44.5 million kg of wool and 2.2 million tonnes of meat, ranking eight in the meat export globally. The value of livestock output during 2003-04 accounted for over six per cent of GDP, which was one third of the contribution made by agriculture and allied sectors. By all accounts it appears that India has an extremely fast growing livestock economy and there is much more to be proud of. It is estimated that almost 18 million people derive their livelihood from livestock population.

Economic reforms, globalization, privatization and the push by global capitalists to enter all arenas of trade and services, aided and abetted by multinational institutions such as the World Bank and the World Health Organization (WHO) are clearly reflected in India’s 9th and 10th plans. Studies by World Bank Livestock Sector Review of India (1996) and the Livestock Revolution forecasts the doubling of demand for production of milk, meat and poultry products by 2020. Also, the production would be shifting from temperate to humid and warm regions situated in the developing world.

1.5 Genetic diversity of Livestock population: Genetic erosion is the loss of genetic diversity including the loss of individual genes and loss of a particular combination of genes which are those manifested in locally adapted landraces. The main cause of genetic erosion as reported by almost all the countries is due to replacement of local breeds by improved or

exotic breeds. The genes and the combination of genes found in the diverse native varieties are not found in the modern varieties.

Livestock and cultivated crops form an integral part of agrobiodiversity, which have greater influence on nature's ecological balance due to their impact and interaction with plants and animals. The process of industrialization in the developed world has wiped out the poor farmers, small entrepreneurs and local breeds. 90% of cattle in the USA and 60% of all European cattle belong to one breed. Broiler and layer chicken in the organized farms across the world rely on less than half a dozen breeds, although there are 606 breeds of chicken available worldwide. The livestock economy penetrates the sections of rural society both vertically and horizontally, supposedly more equitably than land holdings.

The 1996 World Red List identifies 5,205 species as threatened species facing extinction. Of these, pigs, ante-lope and cattle comprise 33 percent. The top five countries with the largest numbers of threatened mammals are Indonesia, China, India, Brazil, and Mexico. The present status is warning us about the perilous status of animals and drawing attention to threats. This genetic wealth is extremely important and could play a prominent and crucial role in alleviating hunger. Since the Indian gene center possesses the capacity to sustain the natural resources, it is possible to maintain the livestock and crop genetic resources through in low-input farming practices.

Depending on the actual size of population it is possible to classify the livestock breeds roughly into different degrees of endangered status. It helps to implement a particular policy aimed at increasing the size of population of rare and endangered wild species associated with agriculture. This will contribute to monitoring and evaluation of the effectiveness of policies addressing the agro-environmental concerns and promoting sustainable agriculture and management of natural resources.

With this background this pilot programme has been proposed in the coastal Karnataka to survey and document the Livestock diversity. As the proposed area is part of the mega biodiversity hot spot in the world located in Western Ghats of Karnataka is endowed with large number of native species with broad genetic base in agro-ecosystem, the proposal assumes a special significance.

1.6 Domesticated animals of Western Ghats: Amongst the domesticated animals found in Western Ghats the cattle, buffalo, goats, sheep, pigs, dogs, cats, rabbits, chicken, geese, ducks, turkeys, guinea fowl and pigeons have been maintained and bred in selected pockets of Western Ghats. Included among the goat breeds endemic to Western Ghats eco-region are Marwari (Kerala), Chigu and Beetal (both from Maharashtra). Sheep breeds native to the eco-region are Mandya (Karnataka), Coimbatore, Nilgiri and Vembur (from Tamilnadu). Hill cattle are locally preserved in Uttara Kannada (Malnad Gidda), Kerala (Vechuri) and Tamilnadu (Malaimaddu).

CHAPTER 2

SCOPE OF STUDY AND THE METHODOLOGY ADOPTED

Uttara Kannada, Dakshina Kannada and Udupi, the coastal districts of Karnataka bordering Arabian Sea include wetland agriculture, horticulture, forest plantations and different agro-forestry systems. Sample areas were selected for study of livestock diversity. Social survey by filling questionnaires and field visits were made for documentation of people's perceptions, attitudes, understanding extent and diversity of livestock owned by them etc. To create spatially explicit maps of the distribution of variability in diversity, latitude, longitude and a few geo-climatic correlates were recorded by using Global Position System (GPS). Secondary information were collected from government departments and other authenticated sources for creation of database and analysis of total livestock diversity of the area.

Formats for collecting information on Livestock diversity were designed by the researchers and experts from Samarpana Trust, Mandya in consultation with the experts from EMPRI and Veterinary College, Bangalore. Interviews with knowledgeable persons and inventory were conducted by Dr. G.K. Anil Kumar, Dr. H.B. Raghu and his team of people from the trust for collecting information on various landscape elements and biodiversity of the locality. Information on knowledgeable individuals were collected with the help of Dr. N. B. Sridhar and his team from Veterinary college, Bangalore and other local experts Dr. Raghu Ram Baht from Ankola, Dr. Subashchandran. Interviews with knowledgeable farmers and staff of Government departments were also conducted for collecting information.

2.1 Objectives: The following objectives were considered appropriate to understand the diversity of livestock in the coastal region of Karnataka:

1. Identification and documentation of Livestock diversity in the coastal districts of Karnataka.
2. Creation of database on the Livestock diversity and their traditional values in coastal Karnataka.

2.2 Sampling strategy: The coastal zone of each district was divided into three broad ecological regions based on land-use systems and topography. Information was collected from these ecological regions located in the coastal taluks of each district.

The Ecological regions are:

1. *Coastal region*
2. *Coastal inland region*
3. *Foot hill region*

2.3 Primary information: Information was collected afresh from the farmers, local experts and the employees of government departments by a team of experts. Primary information was collected from each study region representing the entire range of ecological region of the coastal taluk. The study regions of each taluk representing the overall diversity of the taluk and a social profile of these study areas were generated. Knowledgeable farmers in each study region were interviewed for each ecological region of the taluk. Pre tested

questionnaires were adopted to record the data on the extent of diversity. Emphasis was laid on all types of livestock diversity.

2.4 Secondary information: It is the information already available with other authentic groups or organizations. Relevant information is collected and used as supporting information for enhancing the quality of information system. This information would be useful in understanding the past status of the species or habitat and also its present status in the changing scenario of farming systems and farming community.

After the initial documentation through primary and secondary sources, the information generated was used to create a database. Structure of database suitable for information system was thoroughly discussed and finalized in the orientation meetings with experts from EMPRI, Karnataka Biodiversity Board (KBB) and Indian Satellite Research Organization (ISRO).

2.5 Scientific validation: Efforts were made to collect specific information and precise validation of the same. Few investigators involved in livestock diversity assessment and documentation were given the scientific nomenclature for vernacular names of species recorded by them. But this has been validated by expert consultants like Dr. N. B. Sridhar of Veterinary College, Bangalore. Experts from agriculture universities, EMPRI and KBB in several meetings, have also validated the database.

2.6 Study Area

The Coastal zones of Karnataka includes Uttara Kannada, Udupi and Dakshina Kannada districts situated on the West Coast of India bordering Arabian Sea with a geographical area of 18,582 sq. km. The Arabian Sea borders on the west creating a long continuous coastline of 120 km. There are eight coastal taluks viz., Karwar, Kumta, Ankola, Honnavar, Bhatkal, Kundapur, Udupi and Mangalore. In order to make documentation of the overall livestock diversity of the region we have also included Karkala, Buntwala and Belthangadi taluks of Dakshina Kannada district where part of these taluks are stretching towards the coast. The sites selected for study are harbouring a great variety of domesticated plants and animals. The following table (Table 1) gives information on the sites selected with geo-coordinates and the names of local experts/farmers who have supplied information.

Table 1: Location of study sites in the Coastal districts of Karnataka

Sl. No.	District	Taluk	Ecological region	Village	Latitude	Longitude	Altitude (MSL)	Information Source
1	UK	Karwar	Coast	Idur (Chendiya)	14 46 .168	74 11 .201	45	Mr. Krishnanand V. Beduekar
2	UK	Karwar	Inland	Gopshetta	14 54 .935	74 12 .174	46	Mr. Dnyaneshwar Eishram Naik
3	UK	Karwar	Foothills	Bhaira	14 53 .846	74 15 .839	46	Mr. Anand Gopal Gaonkar
4	UK	Kumta	Coast	Aganashini (Holanagadde)	14 27 .100	74 22 .944	18	Mr. M. R. Hagde, Sneha kunja and Dr. G. K. Koorse, Kumta
5	UK	Kumta	Inland	Anegundi	14 29 .662	74 30 .560	20	Mr. Gajanana Vishnu Shanabhog
6	UK	Kumta	Foothills	Hebbail	14 28 .865	74 27 .426	78	Venkatesh Mahadev Gunaga
7	UK	Ankola	Coast	Manchguni	14 36 .073	74 18 .356	3	Dr. K. M. Raghuram Bhat
8	UK	Ankola	Inland	Kodasani	14 36 .151	74 22 .950	16	Mr. Thppanaik, Kuntgani

Sl. No.	District	Taluk	Ecological region	Village	Latitude	Longitude	Altitude (MSL)	Information Source
9	UK	Ankola	Foothills	Achave (Kuntgani)	14 39 .436	74 32 .661	61	Mr. Rajesh Naik
10	UK	Honnavar	Coast	Haldipura (Abbu chitte)	14 21 052	74 25 698	60	Mr. Lakshmikanth Ganapathy Abu
11	UK	Honnavar	Inland	Jalavalli	14 15 220	74 32 467	57	Mr. N.S. Hegde, Dibbungal and Thippaiah naik, Upponi
12	UK	Honnavar	Foothills	Nagarabasthi kere	14 15 118	74 38 670	43	Mr. Govind Hegde, Raghothama matt and Dr. S. G. Basavaraj, Veterinary hospital, Kekkar
13	UK	Bhatkal	Coast	Mavalli (Murdeshwara)	14 05 .710	74 29 .268	39	Dr. Mahesh
14	UK	Bhatkal	Inland	Kitre	14 01 .510	74 35 .001	87	Dr. K. M. Gurumurthy
15	UK	Bhatkal	Foothills	Kuntwani	14 00 .555	74 37 .467	108	Mr. Umesh B. Hegde
16	Udupi	Kundapur	Coast	Shirur	13 55 .063	74 36 .064	44	Mr. Babu Sherigara
17	Udupi	Kundapur	Inland	Kenchanur	13 40 .507	74 44 .813	11	Mr. Chandrashakera udupa s/o Janardana Udupa
18	Udupi	Kundapur	Foothills	Goliyangadi	13 32 .506	74 54 .812	61	Mr. Jaiprakash Shetty s/o Krishnappa shetty
19	Udupi	Karkala	Coast	Chara (Kardi hamlet)	13 27 .432	74 59 571	97	Mr.Shankar joshy, & Mr. James T.C.
20	Udupi	Karkala	Inland	Mudbidre (Badumarnad)	13 05 .946	75 00 .012	142	Mr. Ballal and Dr. Chandrakanth,
21	Udupi	Karkala	Foothills	Mala	13 00 .355	77 34 .159	101	Mr. Kadari Srinivasa Prabhu and Dr. Nagaraj Balekar, ADA, Karkala
22	Udupi	Udupi	Coast	Kota (Handattu)	13 30 .738	74 41 .806	14	Mrs. Janaki hande w/o Mahabaleshwar and Dr. SarvothamaUdupa
23	Udupi	Udupi	Inland	Kulashakera	12 53 .297	74 53 .227	66	Mrs. Indira marate
24	Udupi	Udupi	Foothills	Charkadi (Aroor)	13 24 .988	74 48 .367	38	Mr. Ramachandra Rao
25	DK	Mangalore	Coast	Kinya	12 47 .037	74 53 .045	12	Mr. Vittal Rao, Kinya
26	DK	Mangalore	Inland	Kembral	13 02 814	74 50 364	16	Mr. Karunakara Sanjiva Shetty
27	DK	Mangalore	Foothills	Badaga Yedapadavu	13 00 973	74 57 558	139	Mr. Ramachandra Rao
28	DK	Buntwala	Coast	Kariangadi	12 49 .734	74 55 .154	16	Shri. P.K.S.Kamath
29	DK	Buntwala	Inland	Kukkipadi	13 00 .817	75 03 .595	107	Shri. Srikanth Padke
30	DK	Buntwala	Foothills	Padar	12 54 .573	75 01 .856	184	Mr. Ramakrishna Shastri
31	DK	Belthangadi	Coast	Venur	13 00 .796	75 08 .285	79	Mr. Narasimha Thunga
32	DK	Belthangadi	Inland	Padgadi	12 59 .422	75 12 .854	115	Mr. Ramesh Herade
33	DK	Belthangadi	Foothills	Mittabagilu	13 09 .594	75 17 .985	127	Mr. B. D. Parameshwer Rao
34	Shimoga	Hosanagar	Foothills	Haniya,				Kamhadhuga, Sri. Ramachandrapura Matt,

2.7 General information on coastal districts of Karnataka: Information with regard to geographical area, forest area, cultivable and non-cultivable areas, literacy, livestock and per capita income was collected from the Department of Statistics & Economics, Bangalore. Table 2 gives the details of each coastal district.

Table 2: District-wise information on landscape elements and livestock in Coastal Karnataka

Sl. No.	Particulars	Uttara Kannada	Dakshina Kannada	Udupi
1	Geographical area (Ha) (2001)	1,024,679	477,149	356,446
2	Forest (Ha) (2001)	815,041	128,476	99,569
3	Cultivable land (Ha) (2001)	149,539	172,445	151,966
4	Non-cultivable land (Ha) (2001)	60,099	176,228	104,911
5	Human population (No.) (2001 census)	1,353,644	1,897,730	1,112,243
6	Literacy rate (%) (2001 census)	76.59	83.47	79.87
7	Per capita income (Rs.) (2001 census)	15,465	25,291	21,291
8	Inhabited villages (No) (2001 census)	1,258	360	252
9	Rainfall (2002)	2,208 mm	3,246 mm	3,643 mm
13	Cattle (No.) (1997 census)	394,618	355,130	386,438
	Indigenous	359,580	291,248	315,804
	Exotic	268	13,801	6,955
	Cross breed	34,770	50,081	63,679
14	Buffaloes (No.) (1997 census)	159,205	57,209	86,419
15	Sheep (No.) (1997 census)	2,450	278	182
	Indigenous	2,012	95	79
	Cross breed	438	183	103
16	Goats (No.) (1997 census)	17,153	22,306	1,547
17	Pigs (No.) (1997 census)	5,963	18,430	2,629
	Indigenous	5,910	12,530	700
	Exotic	43	1,618	316
	Cross breed	10	4,282	1,613
18	Rabbits (No.) (1997 census)	358	593	126
19	Dogs (No.) (1997 census)	100,280	170,537	131,597
20	Others (No.) (1997 census)	91	7	1
10	Total livestock (No.) (1997 census)	680,118	624,490	608,939
11	Poultry (No.) (1997 census)	719,820	1,079,240	970,122
12	Fish catch 2002-03 (M. tones)	37,022	83,160	66,848

Source: Karnataka at a glance 2002-2003

Karnataka Biodiversity Board in collaboration with ISRO is attempting to develop a Coastal Biodiversity Information System (CBIS) containing the data with spatial information. Finally, a full-fledged document containing spatially aggregated information would be made available to the people for use in education, conservation, trade, etc.

CHAPTER 3 DIVERSITY OF LIVESTOCK IN THE STUDY AREA

Even though many local breeds are considered as unique genetic adaptation to specific and harsh environment, impacts on the genetic pool are expected when traditional pure breeds gets replaced by modern breeding methods like production of hybrids, artificial insemination, cloning, etc. Global interest in gene pools has given a new meaning to the term genetic resources. With plant and gene patenting, international companies are attempting to corner the market for vanishing genes. There is struggle for preservation and control of breeding materials such as seeds and livestock genes - on both economic and political fronts between the nations, public and private entrepreneurs.

Cattle, dogs and chicken are the three animal groups maintained as domesticated animals by significant proportion of people since many generations. Buffalo, goat and pig have been introduced in the beginning of 20th Century. Modern breeds of chicken are purchased only for meat. The traditional and native breed of chicken is selectively bred as fighting cocks, as the cockfights are a favorite pastime for some people.

3.1 CATTLE

3.1.1 MALNAD GIDDA (*Bos indicus*) BREED

Among the diversity of cattle Malnad Gidda is a local traditional, hardy, harsh breed with low yield of milk. **Malnad Gidda** (photo sheet 3.1.1.2 plate 3) is a local breed of cattle, which is harsh, sturdy, small to medium in size having a light body to graze in hilly areas, yielding less but thick milk (2-4 liters per day), with high Solid Not Fat (SNF), short and sturdy legs and short horns. Usually, it has brown, red and black skin coat colours. Coastal animals are shorter than their counterparts in ghat areas like Sirsi and Siddapur. They will come to heat after 4 years. Milk is thick and believed to have high nutrition. Animals are well adapted to hot humid and hilly region and are generally let for browsing on their own in forests and open areas. These are resistant to pest and diseases and need less fodder and least care. Lot of variability is found among Malnad Gidda but they are not called as separate breeds. They are named with their special characters like **Varshagandhi** (photo sheet 3.1.1.2 plate 1), which gives one calf every year 'Kabetti' (photo sheet 3.1.1.2 Plate 9), a pale yellowish brown mutant form has been considered as a special sacred breed. Single survey with very limited sampling in the study recorded 27 different types of Malnad Gidda breeds having distinct characters as briefed in 3.1.1.1 and as documented in 3.1.1.2.

3.1.1.1 Description of variability in Malnad Gidda breed

Sl. No.	Scientific name	Common name	Local name	Frequency	Description
1	<i>Bos indicus</i>	Cow	Malanad Gidda	Highly abundant	Local breed, hardy, small to medium and light body to graze in hilly areas, yielding less (2-4 liters per day), but thick milk with high Solid Not Fat. Short and sturdy legs, short horns. Usually, brown, red and black skin coat colours, coastal animals are shorter than animals in ghat areas like Sirsi and Siddapur. Will come to heat after 4 years.
2	<i>Bos indicus</i>	Cow	Varshagandhi (photo sheet	Very rare	Local Malnad Gidda breed with specific character of giving birth to one calf every year and milking up to

Sl. No.	Scientific name	Common name	Local name	Frequency	Description
			3.1.1.2 plate 1)		nine months. Hardy, small to medium built, yielding less, but thick milk with high Solid Not Fat
3	<i>Bos indicus</i>	Cow	Mangalthi (photo sheet 3.1.1.2 plate 10)	Very rare	Local Malnad Gidda breed with specific character of skin coat colour with brown and white patches. Hardy, small to medium built, yielding less, but thick milk with high Solid Not Fat
4	<i>Bos indicus</i>	Cow	Bilga/ Belava (photo sheet 3.1.1.2 plate 11)	Very rare	Local white male Malnad Gidda animal is called Boliya. Sturdy, small to medium built, well suited for agricultural operation.
5	<i>Bos indicus</i>	Cow	Handa (photo sheet 3.1.1.2 plate 6)	Very rare	Local Malnad Gidda breed with specific character of skin coat colour with black and white patches. Sturdy, small to medium built, yielding less, but thick milk with high Solid Not Fat
6	<i>Bos indicus</i>	Cow	Manja	Very rare	Local male animal of Malnad Gidda breed with specific character of skin coat colour with brown/black and white patches. Sturdy, small to medium built, suitable for cultivation.
7	<i>Bos indicus</i>	Cow	Bottu mani/ Chandri	Very rare	Local Malnad Gidda breed with pale brown animal having white small patch on forehead. Sturdy, small to medium built, yielding less, but thick milk with high Solid Not Fat
8	<i>Bos indicus</i>	Cow	Kempa/ Kempri	Very rare	Local reddish brown Malnad Gidda breed. Sturdy, small to medium built, yielding less, but thick milk with high Solid Not Fat
9	<i>Bos indicus</i>	Cow	Mandi/ Kenda	Very rare	Local Malnad Gidda breed with specific character of strong horn bent. Small to medium built, yielding less, but thick milk with high Solid Not Fat
10	<i>Bos indicus</i>	Cow	Karimasa	Very rare	Local Malnad Gidda breed with specific character of horn bent downwards behind the ear without any support in the base. Movement of these horns with its body movement. Sturdy, small to medium built, yielding less, but thick milk with high Solid Not Fat
11	<i>Bos indicus</i>	Cow	Kapile (photo sheet 3.1.1.2 plate 2)	Very rare	Local Malnad Gidda breed with pale brown animal with white small patch on forehead, tail end and center of four leg palms. Sturdy, small to medium built, yielding less, but thick milk with high Solid Not Fat
12	<i>Bos indicus</i>	Cow	Pingali/Mandi (photo sheet 3.1.1.2 plate 12)	Very rare	Local Malnad Gidda breed animal with blueish eye. Sturdy, resistant diseases, small to medium built, yielding less, but thick milk with high Solid Not Fat
13	<i>Bos indicus</i>	Cow	Basaga/Bhoodi	Very rare	Local Malnad Gidda breed with grey coloured skin coat. Sturdy, resistant to diseases, small to medium built, yielding less but thick milk with high Solid Not Fat
14	<i>Bos indicus</i>	Cow	Bodke	Very rare	Local Malnad Gidda without horn (Konkani word). Sturdy, resistant to diseases, small to medium built, yielding less but thick milk with high Solid Not Fat
15	<i>Bos indicus</i>	Cow	Thenkla dhana (photo sheet 3.1.1.2 plate 8)	Very rare	Local Malnad Gidda short, hardy male animal brought from Southward (Kundapur) for cultivation work. Sturdy, resistant diseases, small to medium built,

Sl. No.	Scientific name	Common name	Local name	Frequency	Description
					yielding less but thick milk with high Solid Not Fat
16	<i>Bos indicus</i>	Cow	Dhavigai (photo sheet 3.1.1.2 plate 5)	Very rare	Local Malnad Gidda female (Konkani word). Sturdy, resistant to diseases, small to medium built, yielding less, but thick milk with high Solid Not Fat
17	<i>Bos indicus</i>	Cow	Hubba/Hubbi	Very rare	Local male animal of Malnad Gidda breed having 2-3 mixed coloured skin coat called Hubba and Female animal with similar characters called Hubbi . Sturdy, small to medium built, suitable for cultivation.
18	<i>Bos indicus</i>	Cow	Kenga/Kencha (photo sheet 3.1.1.2 plate 3)	Very rare	Local male animal of Malnad Gidda breed with black and Brown/ red mixed animal. Sturdy, resistant to diseases, small to medium built, yielding less but thick milk with high Solid Not Fat
19	<i>Bos indicus</i>	Cow	Mosa	Very rare	Local male animal of Malnad Gidda breed with blackish grey (Monkey coloured) animal called Mosa . Sturdy, resistant diseases, small to medium built, yielding less but thick milk with high Solid Not Fat, suitable for cultivation.
20	<i>Bos indicus</i>	Cow	Sindhi	Abundant	Local Malnad Gidda breed with specific character of having long umbilical cord, high hump, drooped ears, medium yield, highly resistant to diseases low yielding (1-4 liters per day) with thick milk.
21	<i>Bos indicus</i>	Cow	Aresindhi	Abundant	Cross breed with Malnad Gidda with specific character of having long umbilical cord, high hump, drooped ears, medium yield, highly resistant, low yielding (2-7 liters per day) with thick milk
22	<i>Bos indicus</i>	Cow	Kabbeti (photo sheet 3.1.1.2 plate 9)	Very rare	Local brown Malnad Gidda breed, very hardy animal
23	<i>Bos indicus</i>	Cow	Red dane cross	Very rare	Crossed breed, medium sturdy, red coloured skin coat, big body size, thick milk than Jersey and HF.
24	<i>Bos indicus</i>	Cow	Kavle (photo sheet 3.1.1.2 plate 7)	Very rare	Local yellowish Malnad Gidda breed, very mild, friendly animal, has more religious significance. Yields (2-5 liters per day) with thick milk
25	<i>Bos indicus</i>	Cow	Puttori	Very rare	Very short, sturdy local female sterile animal of Malnad Gidda breed distributed mainly in Sulya and Puttur taluks also.
26	<i>Bos indigus</i>	Cow	Ushna dhare	Very rare	Local breed, sturdy, small to medium built, yielding less thick milk with high Solid Not Fat content. Milk is believed to be highly nutritious, freshly milked raw milk given to kids as medicinal/religious value.
27	<i>Bos indigus</i>	Cow	Kariya (photo sheet 3.1.1.2 plate 4)	Very rare	Local breed, sturdy, strong, small to medium built with black skin coated male animal.

Photo Sheet 3.1.1.2 Variability in Malnad Gidda breed



Plate 1. Varshagandhi



Plate 2. Kapile



Plate 3. Kencha



Plate 4. Kariya



Plate 5. Dhavangi



Plate 6. Handa



Plate 7. Kavale



Plate 8. ThenkleDhana



Plate 9. Kabbethi



Plate 10. Mangalthi



Plate 11. Belva

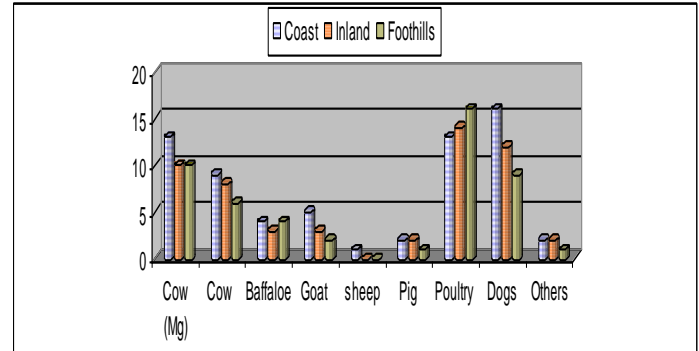


Plate 12. Mandi

Table 3 and Fig.1: Livestock diversity in Coastal taluks of Uttara Kannada District

	Coast	Inland	Foothill	Total
Cow (MG)	13	10	10	27
Cow	9	8	6	12
Buffalo	4	3	4	5
Goat	5	3	2	5
Sheep	1	0	0	1
Pig	2	2	1	2
Poultry	13	14	16	17
Dogs	16	12	9	18
Others	2	2	1	2

Note: MG: Malnad Gidda



Mangalathi (photo sheet 3.1.1.2 plate 10) and **Kabbethi** (photo sheet 3.1.1.2 plate 9) breeds are associated with religious sentiments and beliefs. The region is multilingual in the sense that more than one language is spoken by the people such as Kannada, Tulu and Konkani. Because of multilingual practice the same character of an animal is named differently in different languages for example; Bilia/Boliya/Belava is used for white animal. As the diversity among Malnad Gidda is very high, it is represented under different categories as shown in fig 1. Highest diversity of Malnad Gidda, other cattle, goats and dogs was recorded along the coastal ecological region of Uttara Kannada district, as compared to inland and foothill regions.

3.1.2 INDIGENOUS CATTLE BREEDS

Killari (photo sheet 3.1.2.2 plate 4), **Amruth Mahal** (photo sheet 3.1.2.2 plate 1) and **Hallikar** (photo sheet 3.1.2.2 plate 2) are indigenous working breeds of South India found in small number in Coastal Karnataka. **Sahiwal** and **Kankrej** (photo sheet 3.1.2.2 plate 8) are milking breeds introduced into the region with improved yield. Bharathiya Agro-Industry Foundation (BAIF) is involved in introducing suitable indigenous breeds into the region to increase the yield of milk. **Sahiwal** breed has been introduced by BAIF. There are 14 indigenous cattle breeds recorded other than Malnad Gidda in the region with low density as shown in Fig 1. Among the improved breeds **Jersey** (photo sheet 3.1.2.2 plate 12) or **Jersey crosses** (photo sheet 3.1.2.2 plate 5) have adjusted to the coastal ecological region to a little extent but they are sensitive to diseases and need intensive care. Holstein (photo sheet 3.1.2.2 plate 10) breed is more sensitive than Jersey hence, it is not found along the coastal region but the density of Holstein increases towards foothills and eastwards. Except Malnad Gidda other species are reared under stall-feeding. The high yielding breeds of cattle need intensive care and high investment for feed and protective measures. **Jersey v/s Malnad Gidda cross and Holstein v/s Malnad Gidda crosses** are sturdy with larger body size than Malnad Gidda and yields better and less thick milk than local animals.

3.1.2.1 Description of cattle breeds in Coastal Karnataka

Sl. No.	Scientific name	Common name	Local name	Frequency	Description
1	<i>Bos indicus</i>	Cow	Malanad Gidda (3.1.2.2 plate 3)	Highly abundant	Local breed, hard, sturdy, small to medium and light body to graze in hilly areas, yielding less (2-4 liters per day), but thick milk with high Solid Not Fat. Short and sturdy legs, short horns. Usually, brown, red and black skin coat colours, coastal animals are shorter than ghat areas like Sirsi and Siddapur. Will come to heat after 4 years.
2	<i>Bos indicus</i>	Cow	HF cross (3.1.2.2 plate 9)	Rare	Well-built, crossed breed, producing light thick milk, prefers stall-feeding. Yields better than HF cross, but sensitive to diseases and less preferred along coastal region.
3	<i>Bos indicus</i>	Cow	Jersey cross (3.1.2.2 plate 5)	Abundant	Well-built, crossed breed, medium, sturdy, with medium thick milk prefers stalk feeding, with high yield. Adapted to coastal region.
4	<i>Bos indicus</i>	Cow	Holstein (3.1.2.2 plate 10)	Rare	Well-built, exotic breed, producing light thick milk, prefers stall-feeding. Yields better than HF cross, but sensitive to diseases and less preferred along coastal region.
5	<i>Bos indicus</i>	Cow	Jersey (3.1.2.2 plate 12)	Abundant	Well-built, exotic breed, medium, sturdy, with medium thick milk prefers stalk feeding, with high yield. Sensitive to diseases.
6	<i>Bos indicus</i>	Cow	Mudla/ Khillar (3.1.2.2 plate 4)	Very rare	Drought endurance species native of Bijapur district of Karnataka and Maharashtra. Greyish white coat, small ears held sideways, Long, bow shaped horn, closely set black hooves and black tail. Sturdy animal with moderate to high body for agricultural purpose.
7	<i>Bos indicus</i>	Cow	Amruthmahal (3.1.2.2 plate 1)	Very rare	Known for its power and endurance breed developed and named as Benne Chawadi by rulers of Mysore state for transportation of army equipments. Later Tippu Sultan renamed it as Amruth Mahal. Generally grey coloured, strong animal with strong horns with broad and long and hard hooves close together.
8	<i>Bos indicus</i>	Cow	Sahiwal	Very rare	Indigenous, sturdy, breed with moderately built introduced by BAIF institute for improved yield. Suitable for Coastal region.
9	<i>Bos indicus</i>	Cow	Hallikar (3.1.2.2 plate 2)	Very rare	Best working sturdy breed, medium sized, compact, muscular, draught breed. Skin coat is grey, long face, and strong horn with sharp and black tip. Small ears and tapering, long tail with black switch.
10	<i>Bos indicus</i>	Cow	Kankrej (3.1.2.2 plate 8)	Very rare	Native of Gujarat and Rajasthan, heavy and one of the oldest breeds of India. Grey coat, short face, ears long, pendulous. Animal is used for both milking and ploughing purpose with 2-6 liters of milk per day, thick, quality milk. Comes to heat in 2.5 to 3 years and resistant to diseases.

Sl. No.	Scientific name	Common name	Local name	Frequency	Description
					Broad horns bent forward and upward.
11	<i>Bos indicus</i>	Cow	Sahiwal	Very rare	Indigenous hardy breed from Punjab, BAIF institute introduced milching heavy breed. One of the best dairy breeds, closely related to Sindhi and Gir breeds, hence exported to many countries. Usually reddish, heavy udder. Hardy animal resistant to most of the diseases.
12	<i>Bos indicus</i>	Cow	Deoni (3.1.2.2 plate 7)	Very rare	Animal used for milching and working, native of Bidar district of Karnataka and Maharashtra. Usually Black and white spotted, Grey white drooping ears slightly bulged prominent forehead. Ring humps with long, sturdy limbs, straight and powerful.
13	<i>Bos indicus</i>	Cow	Gir (3.1.2.2 plate 11)	Very rare	Best Milking breed native to Gujarat, known for its tolerance to stress. Red, Speckled red skin coat, eyes partially closed, long pendulous ears, folded like a leaf. Half moon appearance of horns, long tail with black switch. Black Hooves
14	<i>Bos indicus</i>	Cow	Dangi (3.1.2.2 plate 6)	Very rare	Recently introduced native breed of Maharashtra, excellent working qualities in heavy rainfall areas, skin exudes oil secretion which protects from rain, white, shining skin coat with red or black spots over the body, short and thick horns with small ears, black, flint like, very hard hooves.
14	<i>Bos indicus</i>	Cow	Malnad Gidda cross with Jersey	Very rare	Cross animal, sturdy with larger body size than MalnadGidda and yields better and less thick milk than Local animal.
15	<i>Bos indicus</i>	Cow	Malnad Gidda cross with HF	Very rare	Cross animal, sturdy with larger body size than MalnadGidda and yields better and less thick milk than Local animal. Conceive earlier than the above cross.

Photo sheet 3.1.2.2 Diversity of cattle in Coastal Karnataka



Plate 1. Amruthmahal



Plate 2. Hallikar



Plate 3. Malnad Gidda



Plate 4. Killari



Plate 5. Gersy Cross



Plate 6. Dangi



Plate 7. Deoni



Plate 8. Kankrej



Plate 9. HF Cross



Plate 10. Holesten



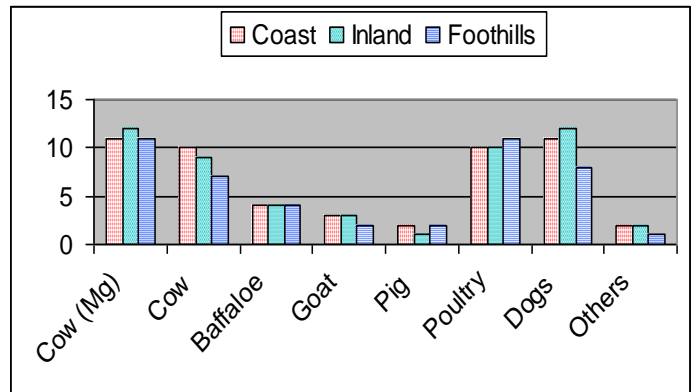
Plate 11. Gir



Plate 12. Gersy

Table 4 and Fig.2: Livestock diversity in Coastal taluks of Udupi District

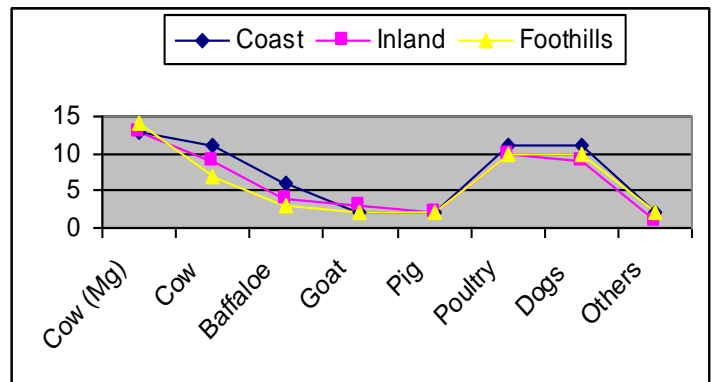
	Coast	Inland	Foothill	Total
Cow (Mg)	11	12	11	24
Cow	10	9	7	13
Buffalo	4	4	4	5
Goat	3	3	2	5
Pig	2	1	2	2
Poultry	10	10	11	15
Dogs	11	12	8	16
Others	2	2	1	2



Diversity of dogs and Malnad Gidda breeds of cattle is high in inland coastal ecological region. Indigenous breed of cattle are found to be higher along the coastal region than Malnad Gidda. Diversity of poultry is high along the foothill region of Udupi district as shown in table 4 and fig 2.

Table 5 and Fig.3: Livestock diversity in Coastal taluks of Dakshina Kannada District

	Coast	Inland	Foothill	Total
Cow (Mg)	13	13	14	14
Cow	11	9	7	16
Buffalo	6	4	3	7
Goat	2	3	2	5
Pig	2	2	2	2
Poultry	11	10	10	14
Dogs	11	9	10	16
Others	2	1	2	2



3.2 BUFFALO

Diversity of the local breed of Buffalo is quite high having less variability. Improved breeds like Surthi and Murra breeds have become dominated among the introduced breeds. Local breed is sturdy, slightly dwarf and medium to heavily built animal. Low yield with thick and high fat percent milk. Sickle shaped horn, inter calving period is two or more years and dries as soon as it gets conceived. Do have non-letting down of milk character. Milk is thick and nutritionally rich. Buffalo is a hardy animal reared with low input and care. Regional sport of Buffalo race called ‘Kambla’ is famous and is an annual religious sport. Specific breed of buffalo is not reared for race but selected strong and robust animals are reared and trained specially for the race.

Variability among local breeds has been documented and described by local names for their variable characters:

- **Halu kombina yemme** (photo sheet 3.6.2 Plate 3): Milky white, thin skin.
- **Konanamore yemme**: Broad faced, harsh looking animal yields more milk.

- **Kudalina yemme:** More body hairs, thick, good quality milk with high fat, used for making good quality butter.
- **Gowli** Black coated, long horn, bent at edge towards neck, low yielding with thick, high fat percent milk. Gowli is a wild buffalo breed reared by the tribal community in the region and also called as **Pandarapuri. Murra** (photo sheet 3.6.2 plate 6) is high yielding improved breed, popular in the region.
- **Jafrabadi** another introduced breed found rarely.

3.2.1 Diversity of Buffalo in Coastal taluks of Karnataka

Sl. No.	Scientific name	Common name	Local name	Frequency	Special characters
1	<i>Bubalus bubatrs</i>	Buffalo	Gounti/ Local	Abundant	Local breed, very sturdy, slightly dwarf medium to heavily built animal. Low yield with thick, high fat percent milk. Sickle shaped horn, inter calving period is two or more years and dries as soon as it get conceived. Do have non-letting down of milk character
2	<i>Bubalus bubatrs</i>	Buffalo	Murra	Abundant	Well-built, crossed breed, with thick milk prefers stall-feeding. Very high yield but sensitive to diseases and suited to coastal region.
3	<i>Bubalus bubatrs</i>	Buffalo	Murra cross	Rare	Horns are heavily curved, well-built, crossbred, with thick, good quality milk, and prefer stall-feeding. Yields till 7-8 months of pregnancy, if properly maintained comes to heat early.
4	<i>Bubalus bubatrs</i>	Buffalo	Sruthi Cross	Rare	Gujarat origin, crossbred, sturdy with medium built body. Prefers stall feeding, with high yield
5	<i>Bubalus bubatrs</i>	Buffalo	Gounti/ Local	Abundant	Very hard sturdy animal, good bulls are strong, used for race (Kambla) and also for ploughing. Called with local names for their variable characters Halu kombina emme: Milky white, thin skin. Konanamore emme: Broad faced, harsh looking animal yields more milk.
6	<i>Bubalus bubatrs</i>	Buffalo	Gounti/ Local	Abundant	Very hard sturdy animal, good bulls are strong, good working animal. Kudalina emme: More body hairs, thick, good quality milk with high fat parent used for good quality butter.
7	<i>Bubalus bubatrs</i>	Buffalo	Gowli/Pandarapuri	Very rare	Black coated, long horn, bent at edge towards neck, low yield with thick, high fat percent milk.
8	<i>Bubalus bubatrs</i>	Buffalo	Jafrabadi	Rare	Horn long and bent downwards, black colored skin. Yields 3-4 liters / day

3.3 GOATS AND SHEEPS

Among goats, the local breed known as Gounti is comparatively good, which is grown only for the purpose of meat. It is a sturdy breed, medium built, tasty meat with medium yield, can be easily reared. Animal husbandry and Veterinary department of Karnataka Government has introduced Mulberry, Deccan, Shirohi and Jamnapuri improved breeds in the region but these are reared in lower density. Details of diversity found among goats are given in 3.3.1. Diversity among goat breeds is high in inland coastal region of Dakshina Kannada as given in table 5 and fig 3.

There are no sheeps in the region except a farmer who has migrated along with his sheeps from Mandya district. He is maintaining these breeds in Ankola taluk of Uttara Kannada district.

3.3.1 Diversity of goat and sheep in Coastal taluks of Karnataka

Sl. No.	Scientific name	Common name	Local name	Frequency	Special characters
1	<i>Capra aegagrushirus</i>	Goat	Local/ Gounti	Rare	Sturdy breed, medium built, tasty meat with medium yield, can be easily reared
2	<i>Capra aegagrushirus</i>	Goat	Mulberry	Very rare	Improved breed from Kerala, with heavily built body, drooping ears, high milk yield, strong animal.
3	<i>Capra aegagrushirus</i>	Goat	Deccan	Very rare	Improved breed from Tamil Nadu, long legged, low body weight with low yield. Good browser and eats leaves of plant in faster manner, prefers stall-feeding.
4	<i>Capra aegagrushireus</i>	Goats	Shirohi	Very rare	Improved breed, medium sturdy, well built, Blackish -brown animal with high yield. Equally strong to mulberry breed.
5	<i>Capra aegagrushireus</i>	Goats	Jamnapuri	Very rare	Improved breed, bigger than both the breeds with large drooping ears.
6	<i>Ovis aries</i>	Sheep (photo sheet 3.6.2 Plate 7)	Local	Very rare	Only one person migrated from Deccan plateau came along with sheep, small to medium built, indigenous breed with tasty meat.

3.4 POULTRY

Local chickens were reared mainly for cock fighting and for regular consumption. Cock fighting is a traditional game and the people are crazy of calling their cocks by different names based on colour like Kempe for red bird, Bilga for white bird, etc. People have given pet names based on their ability to fight like Tyson named after Boxer Tyson, etc. Diversity of traditional bird is found to be higher along the foothill region in Uttara Kannada district than other ecological regions. Density of improved poultry breeds are high due to increased consumption rate. Diversity of traditional poultry is highest along the foothill region as compared to other ecological regions as shown in table 4. This might be due to transfer of genes between domesticated and wild poultry. Table 3.4.1 explains the diversity of 19 local poultry diversity and two improved breeds like Giriraja and Girirani birds that are medium built sturdy, heavy body, big, sluggish movement. Can be reared in both controlled farming condition as well as in the back yard. Yields more eggs than local but less than the layers.

Two hybrid breeds like Layers and Broilers were used and grown abundantly. Rearing of these birds became an attractive income generating activity. Broiler is grown for meat and Layers for egg laying purpose and used abundantly. These breeds in the state meet demand for meat.

3.4.1 Diversity of Poultry birds in Coastal Karnataka

Sl. No.	Scientific name	Common name	Local name	Frequency	Special characters
1	<i>Gallus Gallus domesticus</i>	Poultry	Gounti/Local (photo sheet 3.6.2 Plate 10)	Abundant	Local, sturdy, medium sized bird with tasty meat. Birds used for meat, egg and cock fighting. Birds are called by different names with respect to their special characters. Belva : White bird, Hane Kempa : White bodied bird with red forehead.
2	<i>Gallus Gallus domesticus</i>	Poultry	Gounti/Local	Abundant	Local, sturdy, medium sized bird with tasty meat. Birds used for meat, egg and cock fighting. Birds are called by different names with respect to their special characters. Manichitra : Spotted bird with any colour, Bili gadda : White and red cock.
3	<i>Gallus Gallus domesticus</i>	Poultry	Kochi koli fighter	Rare	Cock fighting is a traditional sport; people are crazy about the sport in this region. Hence they call the cocks by different names with respect to their colour and other characters. Budga : Ash coloured bird, Chitra : Male white bird.
4	<i>Gallus Gallus domesticus</i>	Poultry	Kochi koli fighter	Rare	Cock fighting is a traditional game; people are crazy about the game in the region. Hence they call the cocks by different names with respect to their colour and other characters. Biliga : White fighter, Tyson : Strong cock.
5	<i>Gallus Gallus domesticus</i>	Poultry	Giriraja	Rare	Improved breed, medium sturdy, heavy body, big, sluggish movement. Can be reared with both in controlled farming condition or in back yard. Yields more eggs than local but less than Layers.
6	<i>Gallus Gallus domesticus</i>	Poultry	Broilers	Abundant	Improved breed with medium bodied, fast growing, soft, tender meat. Grown in controlled condition and sensitive to diseases, needs intensive care and grown for only meat in commercial scale in farm.
7	<i>Gallus Gallus domesticus</i>	Poultry	Layers (White Leg horn)	Abundant	Improved breed with medium bodied, fast growing. Grown in controlled condition and highly sensitive to diseases, needs intensive care and grown for egg laying and produces more number of eggs in commercial scale in limited space.
8	<i>Gallus Gallus domesticus</i>	Poultry	Gounti/Local	Abundant	Kempe : Red bird, Belakki : White bird, Kadla : Ash coloured, Kakke : Black bird, Karbolle : Black and white bird, Bilikemmaire : White and red mixed coloured bird.
9	<i>Gallus Gallus domesticus</i>	Poultry	Gounti/Local	Abundant	Gendabolle : White necked bird, Manjole : Slight yellowish bird. Combu : Red fighter, Thambde : Dark brown fighter, Kemmaraga : Dark red fighter cock.

3.5 DOGS

Dog is generally kept in most of the houses for protection or as pet animal. Diversity of dogs is high in the region. Local breed known as the country dog has good reproductive capacity, small to medium built, and sturdy. Prominence has not been given for variability among country dogs. Diversity among dogs is high in the region and recorded highest diversity of improved breeds in towns. 15 dog breeds have been reported in the region with their characters. Some of the improved/exotic breeds are very rare and expensive and are kept by rich people as pet animal.

3.6 PIGS AND OTHER ANIMALS

Density of pig is quite low; local breed and also exotic white breed like White Yorkshire or crosses are reared only for meat. Usually Christians rear white animals and non-vegetarian local communities rear local black animal breeds

Other domesticated animals like cat are reared as pet animals and also to control rodents and rabbits as pet animal and rarely for the purpose of meat. Pigeons are reared as hobby and these are briefed in para 3.6.1.

3.6.1 Description of domesticated animals (pig, rabbit and pigeon) in Coastal Karnataka

Sl. No.	Scientific name	Common name	Local name	Frequency	Special characters
2	<i>Scrofa scrofa</i>	Pig (photo sheet 3.6.2 Plate 5)	Local	Rare	Local bred, Sturdy, small to medium built. No need to take intensive care, usually reared by leaving freely in the village.
3	<i>Scrofa scrofa</i>	Pig	White yarkshare	Very rare	Introduced breed, white skin, heavy built, medium sturdy, prefers stalk feeding, with very high yield.
4	<i>Oryctolagus cuniculus</i>	Rabbits	Russian chinchilla	Very rare	Improved breed, which needs intensive care and management. Used for meat purpose tender meat is having less cholesterol. Induced breeder, which is followed for breeding black, brown or white coloured animals.
5	<i>Oryctolagus cuniculus</i>	Rabbits	New Zealand white	Very rare	Improved breed, which needs intensive care and management. Entire body is white with white ears and used for meat purpose, tender meat with less cholesterol. Induced breeder, which is followed for breeding.
6		Pigeon	Parivala	Very rare	Attractive white, domesticated bird and also wild bluish shaded birds are reared.

Photo sheet 3.6.2 Domesticated diversity in Coastal Karnataka



Plate 1. Surthi Cross Buffalo



Plate 2. Mulberry Goat



Plate 3. Halu kombina Buffalo



Plate 4. Gounti Buffalo



Plate 5. Local pig



Plate 6. Murra Buffalo



Plate 7. Sheep



Plate 8. Gounti Buffalo (Male)s



Plate 9. Cat



Plate 10. Gounti poultry

CHAPTER 4
SUMMARY AND CONCLUSION

The unique diversity of livestock is both a gift of nature and legacy of every generation of farmers since agriculture began. Cattle, dogs and chicken are the three animal groups maintained under domestication by significant proportion of people since many generations. Buffalo, goat and pig have been introduced in the beginning of 20th century. Modern breeds of chicken are bred only for meat. The traditional chicken is selectively bred as fighting cocks, as the cockfights are a favorite pastime for some communities.

Landraces of many livestock animals like Malnad gidda have provided the genes needed for pest and disease resistance or to adapt to hilly region with least care. Diversity and density of Malnad gidda is very high in the region. Variability among the breed is very high with distinct characters namely Varshagandhi etc. These are serving the needs of farmer by providing milk for improving the health and prosperity of people and manure for the enrichment of soil.

Initiative for introduction of indigenous milking cattle breeds suitable for the region by BAIF institute and Ramachandrapura matt were welcomed by the local farmers in the coastal district. Density of local Buffalo breed is high with less variability and improved breeds like Surthi and Murra breeds have become dominant breeds among the newly introduced breeds. No sheep in the region except one farmer migrated to Ankola taluk.

Country dogs with good characters were meant for farm protection. Majority of exotic/improved dog breeds are being kept as pet animals in and around the towns. Other domesticated animals like cat, rabbit and pigeon are reared as hobby.

Traditional breeds have provided the genes needed for pest and disease resistance or to adapt for hilly region having least care, drought and cold temperatures. Unfortunately we are losing this pristine genetic diversity with the introduction of exotics.

Documentation of livestock diversity involves assessment of ecosystem at local level hence; the information needs to be organized by addressing the Intellectual Property Rights and conservation plans. Understanding of the aspirations of people, need for development, conservation priorities and elaboration of biodiversity management plans for sustenance needs to be addressed.

CHAPTER 5 RECOMMENDATIONS

- ***Intensive and season oriented survey and documentation is needed to collect information on higher diversity in the region:*** Working breed of domestic animals are expensive to maintain during the off-season. Hence, the farmer disposes them during summer season. Hence the seasonal data is required to be collected to draw the conservation and management plans.
- ***Protection of traditional and native cattle breeds and preservation of unique characters:*** Traditional breeds have provided the genes needed for pest and disease resistance or for adaptation to hilly region where there is adverse climatic condition. Indigenous breeds are also hardy, resistant to pest and diseases yield comparatively more milk than Malnad gidda like Sahiwal and others. They should be popularized, conserved and protected from biopiracy. The unique characters of traditional/indigenous breeds need to be preserved and protected for further breeding programme in future.
- ***Recognition and providing incentives to persons involved in the conservation of traditional livestock diversity:*** Persons like Mrs. Janaki Honda, Kota village, Udupi and Dr. Raghuram Bhat of Ankola, Uttara Kannada district need to be recognized, honoured and encouraged by providing incentives to create awareness among the younger generation and motivate them to involve in protection and conservation of livestock diversity in the region.
- ***Facilitating marketing channels for livestock products and encouragement of farmers to promote the conservation of traditional breeds:*** Proper marketing channel is needed for dairy products and their byproducts to enhance the income of farmers through milk unions. Value addition at local level provides avenue for generation of rural employment and higher income leading to economic improvement. Improvement in the density of exotic animals is needed.
- ***Assessment of traditional breeds for pest resistance, disease resistance and other good traits for further livestock improvement:*** Milk from traditional breeds is thick and nutritionally rich as compared to other breeds. Resistance of certain local breeds to diseases, pests and drought should be identified and conserved for further improvement programme by creating *in-situ* gene bank.

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