Sheep and Goat Genetic Resources of Orissa

Das Kornel
S.C. Mohapatra
R.M. Acharya

Sheep and Goat Genetic Resources of Orissa

Contributors

Main text and research by Das Kornel, S.C. Mohapatra and R.M.Acharya and Team : Overal coordination by Das Kornel and Bimal Kumar Sahu.

Design Layout

Arjun Ojha.

Printer

IPHP Publication, New Delhi

Photos

Das Kornel

Publisher

Intercooperation India - Delegation, Hyderabad.

Citation

Indo - Swiss Natural Resources Managment Programme - Orissa

Sheep and Goat Genetic Resources of Orissa

A Survey Report

With Government of Orissa

IS - NRMPO Programme Series - 10

Intecooperation Delegation, Hyderabad, India.

Copies available from :

Delegation - Intercooperation India.

8-2-351/r/8, Road No. 3, Banjara Hills,

Hyderabad 500034, India,

Telephone : 91 40 2335 5891

Email : info@intercooperation.org.in

CONTENTS

ACRONYMS

AI	Artificial Insemination
BW	Body weight
CC	Chest circumference
DAH & VS	Department of Animal Husbandry and Veterinary Services
F & ARD	Fisheries and Animal Resource Development
FAO	Food and Agriculture Organisation
FMD	Food and Mouth Disease
HS	Hemorrhagic septicemia
HW	Height at withers
ICAR	Indian Council of Agricultural Research
ISNRMPO	Indo-Swiss Natural Resource Management Programme Orissa
KBK	Undivided Koraput, Bolangir and Kalahandi district of Orissa
L	Length of the body
L1	Distance between joint of wither and hip joint
L2	Distance between hip joint and shoulder joint
NC	Neck circumference
NGO	Non-Government Organisation
OBC	Other Backward Class
PC	Paunch circumference
PPR	Peste de Petits Ruminantes
SC	Scheduled Caste
SDC	Swiss Agency for Development and Cooperation
SEBC	Socially and Educationally Backward Class
ST	Scheduled Tribe
TC	Thigh circumference

ACKNOWLEDGEMENTS

This Documentation research on Sheep and Goat Genetic Resources of Orissa is the culmination of series of actions including desks study and one workshop to plan the study with all stakeholders including professionals and farmers in the field, researchers from University and organisations and many others. We are thankful to all of them for their sincere cooperation.

The study team is extremely thankful to Mr. Ashok Tripathy, former Commissioner-cum-Secretary, Fisheries and Animal Resources Development Department(F&ARD), Government of Orissa, Ms. Lucy Maarse, former Deputy Coordinator and IC delegate, Dr. (Capt.) K. R. Viswanathan, Head, WRSU, Swiss Agency for Development and Cooperation, New Delhi and Mr. C. J. Venugopal, Commissioner-cum-Secretary, F&ARD, Govt. of Orissa, Ms. Rupa Mukerji, Delegate IC-India, Hyderabad, Mr. B. K. Dhal, Director of AH&VS, Orissa and Prof. K. Pradhan, former Vice Chancellor, Orissa University of Agriculture & Technology, Bhubaneswar for the vision and all support given to complete the study.

Indo-Swiss NRMPO office and Directorate of Animal Husbandry and Veterinary Services, Orissa have provided considerable support allowing access to data, information on animal genetic resources of Orissa and documents. The study team is grateful to them for their support and encouragement.

The study team also takes this opportunity to thank the IC- Delegate, Hyderabad, SDC, New Delhi and IS-NRMPO, Bhubaneswar for entrusting the task of field study and documentation of Sheep and Goat Genetic Resources of Orissa.

The study team is thankful to National Bureau of Animal Genetics Resources, Indian Council of Agricultural Research, Karnal and FAO, Rome for providing the study format to describe the Sheep and Goat genetic resources.

Das Kornel
S. C. Mohapatra
R M Acharya

EXECUTIVE SUMMARY

Geographic profile of Orissa

Orissa is the 10th largest State of Indian Union based on land area. It is situated in the eastern coast of India between 17°48' – 22°34' North latitude and 81°24' – 87°24' East longitude. Of the 15.67 million hectares of landmass 36.7 per cent is forest, 50.74 per cent cultivable area and 4.41 per cent is permanent pasture. It is rich in natural resources and very rich in biodiversity.

Demographic profile and Social groups

The human population of the state was 36.7 million in 2001.There are 62 ethnic tribal groups (Adivasis) in the state who belong to Austro-Asiatic, Dravidian, Indo-Aryan and mixed groups. Orissa has a very high proportion of Scheduled Tribes (STs) and Scheduled Castes (SCs). They together, account for 38.3 per cent of the total population of the state; of which STs accounted for 22.1 and SCs 16.2 per cent of the total population.

Of the total population, 72.3 per cent live in rural Orissa and 64.7 per cent of them are agricultural workers.

Background

Livestock constitutes an integral part of livelihood systems. In many parts of Orissa livestock farming is traditional subsistence strategy compatible with local natural resources. It is an important source of income for poor and marginalised groups of farmers. Improvement of livestock breeds, therefore, is one of the major thrust areas to increase production, maintain sustainability and improve economic growth.

Small animals especially the sheep and goats contribute immensely to family income of a large proportion of small and marginal farmers' households under livestock and crop mixed farming system. They hold an important place in the landless households. It has a traditional and caste specificity relationship; in Orissa the Golla and some Gouda community exclusively earn their livelihood from rearing of sheep and goats.

Livestock population and growth rate

The state has a livestock population of 23.3 millions of which about two-thirds (15.2 millions) are bovines, one-third (7.5 millions) small ruminants and 0.6 million are pigs. Further, three out of four small ruminants are goats.

The livestock population of Orissa grew at a high rate of 2.36 per cent till 1982. The growth rate declined to 1.19 per cent in the eighties. The growth of sheep population showed steep deceleration in the growth between 1982 and 1992 and declined at an annual rate of 0.65 per cent per annum. The goat population, on the other hand, increased at a rate of 0.94 per cent per annum. Thus the over all growth rate of small ruminants was 0.5 per cent per annum.

Structure of small ruminant sector

Small ruminant production is a common activity in the state and taken up by people belonging to almost all castes. Some ninety per cent of the animals are with other backward classes, Scheduled Tribes and Scheduled Castes.

The number of sheep and goats per household is 8.77 out of which 70.3 per cent are goats and 29.7 per cent are sheep. Among the holdings 69.5 per cent are goat holdings, 23.4 per cent are sheep holdings and 7.1 per cent of holdings have both sheep and goat. Size of holding is lowest in coastal region and highest in KBK region. The average size of the flock was found to be 10.1 in KBK districts, 9.3 in northern region, and 6.1 in coastal region. There are no pure sheep holdings in northern region. All the households in the region keep sheep along with goats.

Sheep and goats are the means of livelihood for over 40 per cent of the rural population. More than 87 per cent of the sheep and goats are raised in smallholder production system and mostly used for production of meat.

According to recent livestock census there are 20 small ruminants per 100 persons in the state. The density of small ruminants has positive correlation with percentage of forest cover and the proportion of scheduled tribes and a negative association with rate of urbanization and literacy rate. This suggests that small ruminant production is more important for weaker sections of the society and backward areas.

Production and consumption features

About 85 per cent of the population in the state are non-vegetarian; chevon (goat meat), mutton (sheep meat) and poultry meat besides fish are very popular dishes. Meat production from goat and sheep account for 64.6 and 22.5 per cent respectively of total meat produced in the state from small ruminants and pigs. The demand for goat meat and mutton is increasing over the years.

Goat milk is popular in the districts of Ganjam, Gajapati and Nayagarh. Goats in Orissa contribute nearly 2500 MT of milk annually, most of which are used for home consumption either as liquid milk or processed into ghee. Ghee is considered to have medicinal value and sold at a premium price. This further strengthens our assumption that there is a need to improve milk production for production of liquid milk and ghee to supplement farm income. Goat milk utilization is a strong cultural linked practice and can be strengthened where people favour it. Good milk production ability of goat and sheep breeds is equally essential for faster growth of kids and lambs.

The manure from sheep and goat is highly valued by farmers. The skin of sheep and goat is in the hands of butchers and middleman specifically traditional Muslim traders. People hardly utilize the wool from sheep. Penning of sheep and goats on the paddy field is a good source of income for sheep and goat farmers in Ganjam district and neighbouring areas of Khurda and Nayagarh districts of Orissa.

Major goat and sheep producing districts of Orissa are Mayurbhanj, Keonjhar, Bolangir, Kalahandi, Ganjam, Cuttack and Koraput whereas Sundergarh, Balasore, and Phulbani are major producers of goats only.

Grass grazing dwarf goats of Orissa

The Bengal goat breed has unique feature of grass grazing like sheep; butchers claim that grass grazing goats have lean meat carcasses whereas in places where leafy food is available the growth is better but the carcasses are fatty. Consumers' preference is for goat meat with fat.

Sheep and Goat Farming Systems

All sheep and goats are raised in extensive system of production. Supplemental feeding is practiced by smallholder farmers in few pockets in coastal districts.

Stall feeding of kids and lambs upto three months of age is followed by 'Gollas' of Ganjam district as it helps to reduce mortality and allows milking of goats once a day.

Cost of rearing is low when the flock size is big. Golla small ruminant owners often join together to take care of their flocks and share labour which further reduces the cost of rearing.

Consumer preferences for sheep and goat meat cuts and type

Wide variation is observed in castration of males. The farmers of Ganjam, Dalua, Malkangiri, Narayanapatna, and Raighar goats sell the males population without resorting to castration whereas farmers of Black Bengal and Bada Vihana flocks castrate the goats before sale. Similarly, Ganjam, Dalua and Koraput sheep are not castrated before sale whereas in all other breeds of sheep surplus males are castrated at about 2-3 months of age and sold thereafter. This practice of castration in different parts of the state is based on consumer preference for meat as well as the demand for religious sacrifices.

The consumers in the coastal Orissa prefer inter-coastal muscles called *sinna* or chest as meat, whereas in other districts of Orissa mostly in KBK districts meat of lumbar region and thigh muscles are preferred. So the selection is directed towards *sinna* muscles in sheep and goats in the coastal districts of Orissa and for lumbar and thigh region in other districts.

Genetic resources of sheep and goats of Orissa

Orissa has two breeds of goats viz. Black Bengal and Ganjam both of which have been recognized by the FAO and ICAR. Breed description of these two breeds along with their level of production and reproduction performance in hot and humidity conditions of Orissa is well documented (Acharya, 1982; Khan and Rai, 2002; Kornel, 2004; and Patro and Rao, 2004). Kornel, 2004 reported the existence of a few more goat breeds. Breed characteristics of these new breeds although reported to some extent need further investigation for confirmation.

Bolangir and Ganjam are the two breeds of sheep in Orissa recognized both by FAO and ICAR. The breed characteristics of these two breeds along with their production and reproduction performances in their home tract are well documented (Acharya, 1982; Khan 2004; Kornel, 2004; and Mohanty, 1991). Kornel, 2004 reported the existence of few more breeds of sheep in the State along with their breed characters which like new goat breeds need confirmation.

Methodology followed for this study

Format suggested by FAO (The Global Strategy for Management of Farm Animal Genetic Resources. Executive Brief, FAO, Rome, 1999) was utilized for description of breed characteristics of sheep and goats.

At least 50 animals of each breed were measured for all the phenotypic characters except for adult body weight, data for which were collected in more than 200 animals in each breed. Data for geographical location of the habitat was collected from district profile, 1995-96 compiled by DAH & VS, Orissa, Cuttack.

Small ruminant genetic resources of the state identified on the basis of the study include 7 breeds of goat and 7 breeds of sheep. The main breed characteristics of these breeds have been summarized below.

Goat Breeds of Orissa

Black Bengal

This breed of goat is raised in smallholder production system and mostly found in all the northern districts and rarely in southern districts of the State. Population size of Black Bengal goats in the state is very large. Black, brown and white are the most common coat colours. It is a dwarf type of goat with short legs and deep body. Black Bengal goats are known for their high prolificacy and kid twice a year. First kidding occurs at about 13 - 15 months of age. Twin birth is very common. About 60 per cent of goats give birth to twins, 5 to 10 per cent to triplets and rest to singles. Quadruplet birth has also been recorded. Most of the does breed within one month after kidding. Meat of the Black Bengal goat is considered to be very tasty and sold at a premium price. Milk yield is adequate enough to take care for multiple kidding. The lactation length is 3 months. Skin of Bengal goat is of superior quality and in great demand.

Bada Vihana

Mostly found in Nayagarh district of Orissa, raised in smallholder production system and has been developed in last 20 years by crossing of Black Bengal does with Ganjam bucks and interbreeding of crossbreds coupled with selection. The predominant coat colours are black, brown, and mixed black and brown with white patches in some. It is a medium sized prolific breed of goat with three kiddings in a period of two years. First kidding occurs at about 18 months of age. Sixty per cent of the goats give birth to twins from second birth onwards. Most of the goats in the first birth give singles. Adult body weight varies from 28 to 35 kg. in males and 20 to 26 kg. in females.

Dalua

A medium sized goat, mostly found in Chilika coast of Rambha and Khallikote blocks in Ganjam District of Orissa and patronized by Golla community. The breed may have been derived from Ganjam goats. More than 90 per cent of the goats are black in colour and the rest are brown and black mixed. The breed is characterized by large drooping ears, big horns, and lustrous black coat colour. The body weight in adult goat varied from 31 to 38 Kg. in females and 35 to 52 Kg. in males on samples measured. The first kid is born at 2½ years of age and there are 3 kiddings during a period of two years. More than 90 per cent of does give birth to singles. The average milk yield is about 300 g. and the lactation period is 5 months.

Ganjam

Mostly found in Ganjam, Gajapati, Rayagada, Khurdha and Nayagarh districts of Orissa and patronized by Golla community. The breed is characterized by long legs, medium size pendulous ears, lustrous black and dark brown coat colour, late maturing, annual single kidding, with heavy body weight and imparts goatish smell to both milk and meat. First kidding occurs when the goats are 2½ years of age. The milk yield is poor. Un-castrated males are retained by the farmers for a long time before sale, which is not an economical practice.

Malkangiri

It is found in Malkangiri district of Orissa. Developed and nurtured by tribal community of Malkangiri. Ears are of medium size, erect and extend horizontally.

The predominant coat colour is brown. Does are early maturing, prolific with two kiddings in 14 months. First heat occurs at 7 months of age and first kidding at 12 months of age. Mostly give birth to twins. Average milk yield is 500 g. and lactation period is 5 months. The average adult body weight is about 30 kg. for males and 27 kg. for females. They grow fast and gain good body weight.

Narayanpatna

It is found in Narayanapatna Block of Koraput district, a late maturing but prolific goat with two kiddings in 14 months. The first kid is born at 2½ yeas of age, twin birth is common, udder and teat are medium in size, average milk yield is 600 to 700 g. per day and lactation period is 5 months. Adult body weight of Narayanpatna goat varies from 37 to 39 kg. in males and 24 to 36 kg. in females.

Raighar

Mostly found in Raighar and Umarkote blocks of Nabarangpur district in Orissa. The breed is known for its early maturity, high prolificacy, mostly twin births with two kiddings in 14 months. Udder and teat are medium in size. Average milk yield is 600 gm. per day and lactation period is 4 months. Adult body weight varies from 25 to 35 kg.

Sheep Breeds of Orissa

Bolangir

Found in Bolangir, Bargarh, Sambalpur, Sonepur and Sundergarh districts of Orissa. Males are horned and females are polled. Ear length is highly variable. Three varieties are recognized based on ear type such as stumpy, small and medium. Beard and wattles are absent, tail is medium in size and thin, late maturing, inter lambing period is 9 to 12 months. Ninety five per cent of the ewes give birth to singles. Average adult body weight is 23 kg. for females and 26 kg. for males. First laming occurs at one and half year to two years of age. It is a recognized breed of sheep.

Chhotnagpuri

Found in Mayurbhanj and Keonjhar districts of Orissa. Both the sexes are polled. The coat colour varies from light gray to dark brown, coarse and hairy wool, thin and small tail. First lambing occurs at twelve to fifteen months of age, two lambing in a period of one year, and 90 per cent of the ewes give birth to singles. The average adult body weight is 26 Kg. for males and 23 Kg. for females. This is a recognized breed of sheep.

Dalua

Found in Chilika coast of Rambha and Khallikote blocks of Ganjam district in Orissa. A medium sized breed of sheep and characterized by lustrous golden red coat colour, drooping ears, with small and thin tail. Males are horned and females are polled. More than 60 per cent of ewes give birth to singles and rest to twins. First lambing occurs around one and half year of age. Inter lambing period is 270 days. The average body weight is about 43 Kg. for males and 30 Kg. for females.

Edka

Found around Chilika lake in Khurda and Puri districts of Orissa. Males are horned and females are polled. Ears are medium in size and extend horizontally. The

adult body weight varies from 22 to 30 kg. in females and 25 to 35 kg. in males. It is a highly prolific breed with 85 per cent twinning and 10 per cent triplets, and two lambing in 12 to 14 months. First lambing occurs at one and half year of age.

Ganjam

Found in Ganjam, Khurda, Gajapati and Phulbani districts of Orissa, patronized by Golla community living in Orissa. Predominant coat colour is white with black or brown patches and brown to dark tan with whitish abdomen. Males are horned and females are polled. Ears are medium in size and drooping. Fleece is hairy and short. Average adult body weight is 29 kg. for females and 35 kg. for males. First lambing occurs at twenty months of age, mostly give birth to singles. Inter-lambing period is nine months. Breed is recognized both by FAO and ICAR.

Koraput

Found in Koraput, Nabarangpur, Malkangiri and Rayagada districts of Orissa, developed and nurtured by tribal groups belonging to Bhattra, Bhumia, Matia and Koya community. Males are horned and females are polled. Body coat is hairy and coarse. Ears are mostly notched and few have medium ears. The predominant coat colours are of various shades of brown and gray, tail is small and thin. Average adult body weight for females is 24.1 kg. Sheep found in Machhkund and Dasamantapur area are prolific, 40 to 60 per cent of which give birth to twins. The first lambing occurs at 14 months of age and there are two lambings during a period of 14 months.

Kuzi

Mostly found in coastal districts of Orissa like Puri, Jagatsinghpur, Cuttack and Kendrapada. Horns are absent in both the sexes, small in size, with small and thin tail, and highly prolific. Eighty per cent of ewes give birth to twins and 10 per cent to triplets with two-lambing during a period of 12 months. First lambing occurs at one year of age. The adult body weight is about 18 kg. for females and 20 kg. for males. Kuzi sheep found close to sea coast are dwarf. Higher body weights were recorded for the Kuzi sheep in Jagatsinghpur district.

Observations on breeding and management practices

Prolificacy in sheep and goats of Orissa

Prolificacy is one of the most desirable traits for meat animals like sheep and goats. Study revealed that five out the seven goat breeds viz. Bengal, Bada Vihana, Malkangiri, Narayanapatna and Raighar goats are prolific and give birth to twins even triplets. Quadruplet births have also been recorded in some of the breeds like Black Bengal. Among the sheep breeds Kuzi and Edka were found to be highly prolific with more than 80 per cent of the ewes giving birth to twins and ten per cent to triplets and occasionally to quadruplets. Kuzi is early maturing and first lambing occurs at one year of age whereas in Edka, first lambing occurs at one and half year of age. Dasamantapur and Machhkund strains of Koraput sheep are prolific but lesser in degree as compared to Kuzi and Edka. About 40 to 60 per cent of ewes of these two regions give birth to twins.

Kuzi, Edka, Bolangir and Chhotnagpuri breeds of sheep give two lambings in a period of one year whereas the Koraput sheep gives two lambing in fourteen months. The inter-lambing period is 9 to 12 months for Dalua, Bolangir and Ganjam.

Castration of surplus male kids and lambs

All the females and required number of males are saved and used for breeding whereas surplus males not required for breeding are sold. The male to female ratio varies from breed to breed and from flock to flock within the breed. Usually the ratio of male to female is maintained at 1:5 or 1:10. In coastal region, owners of small flocks do not keep males for breeding and hire them on payment at the time of mating.

Study revealed that 50 per cent of the male kids and rams are sold by 1 year of age, 38 per cent from 1 year to 1½ year of age and the rest 11 per cent thereafter.

Large flock management system

A significant proportion of flock owners maintain both sheep and goat. Grazing of animals in such system is usually managed by family members. Elderly persons and women do not take direct part in flock grazing management. Female participation is limited to management of kids and lambs at home.

Ganjam and Dalua goats and Ganjam and Dalua sheep patronized by 'Golla' community are usually raised in flocks. The flock management is a type of cooperative system of rearing. A flock usually consists of as low as 500 to as high as 3000 animals belonging to 5 or 6 or even more owners. The owners take care of the flock in rotation by themselves or by use of hired labours. The animals are reared in the forest during crop season. After the cropping season usually in the month of November, the animals are taken to the farmer's field for penning. Thus the animals stay in the forest for six months and in the farmer's field for remaining six months. For penning purpose, the animals are kept in the field only during night and taken for grazing during the day.

The animals are usually milked for a period of 2 to 3 months in each kidding. Though the animals are reared jointly, every owner maintains the identity of his flock by marking the ears. The flock system has advantage since it helps in efficient use of labour and brings significant income from penning.

Breeding seasons

Although sheep and goat in Orissa breed throughout the year, there are two principal lambing and kidding seasons i.e. i) March and April, and ii) September and October. The second period is preferred mostly due to plentiful availability of greens. Most of the sheep and goats kid/lamb during this season. Kidding and lambing during March and April is not preferred since mortality among newborns is high due to limited availability of vegetation for browsing which affects milk production consequently growth rate.

Inbreeding

Migration of individuals from one flock to another is very limited resulting in high degree of inbreeding. In recent years, some bucks are exchanged among the flocks to reduce inbreeding. This has helped considerably to bring about improvement in the performance traits including growth.

Mortality of sheep and goats

Mortality rate is very high in small ruminants of Orissa: 31.62 per cent for sheep and 38.62 per cent for goats. Mortality rate is influenced by size of the flock;

less in small flock compared to large flocks. Mortality rate is highest in coastal region and lowest in southern region. Mortality is higher in goats as compared to sheep (32.2 per cent vs 17.1 per cent) in KBK region whereas the reverse is true for coastal region. The common diseases which cause mortality in goats and sheep include PPR (*Peste de petits ruminantes*), pneumonia, pneumoenteritis, HS, coccidiosis, Goat/Sheep pox, foot rot, nutritional deficiency, ecto and endo parasitism. Vaccination and deworming is usually not popular with sheep and goat farmers which is the main cause of higher mortality. Only 48 per cent of the farmers vaccinate the flocks against important diseases and 22.73 per cent get their flocks dewormed. Farmers of KBK districts hardly deworm their flocks. Modern practice of medicine for control and prevention of diseases do not appear to be very popular with the sheep and goat breeders. All the sheep and goat breeds identified on regional basis of this study are reported to be relatively resistant to helminthiasis. The incidence of Cenurus cerebralis in Golla flocks is high.

Foot rot and foot abscess are very high in Dalua and Ganjam breeds whereas the incidence is least in Bengal goats. Similarly the incidence of contagious ecthyma is higher in Bengal goats compared to Ganjam goats. Orissa sheep and goats are relatively more resistant to endo-parasitic infestation; this was evident when other Indian breeds were introduced into flocks for upgrading of local breeds of sheep (Kornel and Brunse, 2002). In the past, when Northern Indian goats were used for upgrading of local goat breeds lumbar paralysis due to filarial parasites was encountered but the local goats were immune and did not manifest any symptoms of lumbar paralysis. The same has been noted for Australian Corridale sheep in Hissar and recently in Australian Boer breed goat in Pune.

Predation is a problem in some of the villages located either near or within the forest areas. Mosquitoes also are sources of annoyance in coastal districts of Orissa and cause unrest to the flocks consequently affect their performance. Some Edka sheep farmers use mosquito net for preparing shelter to prevent mosquito menace.

People responsible for development of local goat and sheep breeds

Although no definite evidence is available about the origin of different breeds of sheep and goats, the Gollas, Goudas or Yadvas and ethnic tribal groups seem to have played significant role for development and maintaining the uniqueness of breed nurtured by them for years without any ingress from outside. Koya and Matia tribes of Koraput are primarily responsible for development of Malkangiri goats; Koya, Matia, Bodo Poraja, Bhumia and Bhattara for Koraput sheep; Bhattaras and Gond for Raighar goats; Kondhs of Narayanapatna for Narayanapatna goats; Sabaras and Kondhs of Bolangir and nearby districts for Bolangir sheep; Santalas and other tribes of Mayurbhanj and Keonjhar for Chhotnagpuri sheep, Golla community for Ganjam and Dalua goats and Ganjam and Dalua sheep; and Goudas for Kuzi and Edka sheep, Muslims, Goudos, Scheduled Tribes and Scheduled Castes for Bengal goats. For ethnic tribal groups small ruminants like sheep, goats and poultry are of special interest because of their socio-religious vis-à-vis economic use and dietary habits.

RECOMMENDATIONS

Numerically as well as from livelihood point of view goat and sheep are considered important species of domestic livestock of Orissa only next to cattle and account for more than 32 per cent of total livestock population of the state in 2001. Forty per cent of the rural households depend upon sheep and goats for their livelihood. Goats and sheep contribute to the subsistence of smallholder and landless rural poor and provide marketable commodities like live goat and sheep, meat, milk, skin and manure. Meat produced from sheep and goats accounted for 87 per cent of the total meat produced in the state from small ruminants and pigs. Goats also produce 2500 MT. of milk per annum most of which are used as liquid milk and rest for production of ghee.

In pastoral and subsistence farming societies of Orissa, sheep and goats are kept as a source of investment and as an insurance against disasters. Most communities especially the tribal societies attach deep socio-cultural and religious sentiments to goats and sheep. Specific coat color, sex, age and appendages over body are essential in selection of animals for sacrificial purposes this indirectly supports the conservation of biodiversity observed for small ruminants in the state.

Goats and sheep make important contribution to the stability of smallholder farming system providing organic manure and financial resources for purchase of farm inputs and as shock absorbers to agricultural disasters, especially in erratic and low rainfall regions in the country.

Change in consumer habit, both lifestyle and dietary preference, couple with rapid urbanization has increased the demand for animal protein in the country. Many are of the opinion that the trend is likely to continue in future. Major part of this demand is being met from fast growing commercial poultry sector. The small ruminants share a small portion of this requirement due to increase in the number of sheep and goat slaughter. Future growth in production has to come from improved productivity, and not from increase in number alone as in the past. This is an area of concern; most planners are of the opinion that India has to improve the productivity of its livestock population to meet the new challenges. The same norm applies to Orissa situation also. No systematic improvement programme has yet been undertaken in the state to improve the growth and productivity of sheep and goats. As a result, there is considerable genetic variability within and between the breeds to bring about improvement through selection. All the goat and sheep breeds available in the state are well adapted to their environment and considered to be relatively resistant to most of the common diseases of sheep and goats including internal parasitism. In the backdrop of above facts it is recommended that –

- All the goat and sheep breeds identified and genetically characterized on the basis of this study should be conserved *in situ*. Attempts should be made to improve their performance for use now and in future by use of selective breeding, upgrading and formation of new breeds or all the above methods.

- Unlike all the sheep and goat population in India, Orissa sheep and goat breeds need to be efficient in productivity traits like body weight, growth rate, FCR, meat quality and milk production. Since last two decades body weight has remained unchanged and challenge is to select males from

flocks to improve the breed efficiency in those regions and communities where entire ram and bucks are in demand.

- As said above the goat and sheep in the state of Orissa are primarily used for production of chevon and mutton respectively. Body weight at the time of marketing and the prolificacy to produce more number of progeny are the important traits of the meat type goats and sheep. In order to improve these two traits, male kids/ lambs should be selected from the families with large effective litter size. Body weight at the three months of age/ weaning should be the criterion for selection. Mothering ability is also important and should be kept in mind while selecting the kids/lambs from the families with high litter size. Health of the kids/lambs provides indication of good mothering ability. The kids/lambs identified on the basis of above should be monitored till one year of age for their body weight gain and other physical attributes. The management conditions should be uniform for all. Second selection among these kids/lambs should be made at this age and the required number of males should be selected for purpose of reproduction.

  In goat and sheep breeds body weight gain is usually fast until weaning and till 9 months of age under good feeding management. The selection procedure suggested above is expected to improve reproduction performance of does/ewes, body weight of bucks/rams and carcass yield. These have to be practiced under village conditions with free range production systems. When selection is to be made in institutional flocks there is a need to use the advanced scientific methods of selection to bring about improvement. Selection for high litter size will need more milk for growth of the kids/lambs. In such cases, selection may also be practiced for milk yield.

- In Orissa, goat and sheep milk are utilised as liquid milk and ghee in Ganjam, Gajapati, Nayagarh and some parts of Khurda districts. When milk production is to be improved upon, major emphasis should be given to lactation yield and lactation length. Milk production can be increased in goats and sheep by selection based on an index involving age at first kidding/lambing and first lactation milk yield. The index suggested is ($I = 3.1 X_2 - X_1$) where X_1 refers to age at first kidding/lambing and X_2 to first lactation milk yield (Singh *et al.,* 1970). The index suggested is so simple that it can be utilized even under village conditions. Selection for single kidding/lambing, long lactation period and long inter-kidding/inter-lambing period would be most desirable in the goats selected for milk production.

  The local goat breed can be developed to dairy and meat type dual purpose goat. So, single kidding and long lactation due to long inter – kidding will be an ideal option for selection to high milk yield without goatish odour which will pay more.

- Upgrading is another means of improving the performance. In such case the females of the local breeds, the performance of which is considered poor are mated with the males of indigenous improved breeds/ exotic breeds. Grading up with indigenous and crossbreeding with exotic breeds will help to increase meat production both in goat and sheep. This method may also be used for development of new breeds. Selection of improved

breeds should be done with caution so that it may not affect the prolificacy of the Orissa goat and sheep breeds. Matching specific genes to specific environment should be the top priority and caution should be exercised before introducing such new genes.

Crossing of does of indigenous goat breeds with Barbari and Beetal bucks were tried in the past in Orissa and performance of progency was satisfactory but, mortality among Beetal bucks due to lumbar paralysis discouraged further introduction. Now the disease is curable. In recent years small scale breeding of local goats with Barbari and Sirohi and Jamunapari breeds has been tried. The farmers are satisfied with results so obtained. Barbari is accepted on small dwarf goats and it is improving the milk yield of its progeny and at first cross prolificacy is unaltered.

The Sirohi can be best choice to improve Ganjam and Dalua goat. It is single kidding goat breed with good milk and meat. Jamunapari and Beetal are good in milk, meat and kid numbers. They require good managemement and feeding environment.

For improvement of indigenous sheep breeds, particularly for Bolangir and Chhotnagpuri sheep heavy breeds like Malpura breed, Nali, Sonadi and Patanwadi may be tried. The Malpura and Patanwadi breed crosses with local Koraput sheep are showing satisfactory performance but highly prone to parasitic diseases.

The options for upgrading the local sheep thus rests on matching the geno types to the specific environment.

- Ganjam and Dalua goats which are well adapted to forest, hill and stable grazing situations are highly uneconomical due to late maturity, long inter-kidding interval, single kidding and poor milk yield. For many generations, breeding bucks have been selected basing on its size and vigour. There has been no selection of nannies except elimination of sick and old goats. Naturally there is enough opportunity to improve the early maturity, reduction in inter-kidding interval and milk production by crossing with breeds having superiority in terms of either or both traits.

- Prolific Black Bengal goats which are dwarf meat type animals produce more kids per unit of time. Like sheep these animals do graze close to the ground though can browse in hills. Obviously the only improvement, this breed need is an increase in body size without affecting prolificacy. No known breed of goat having larger size seem to be useful for crossing these animals unless it is decided as a matter of policy to convert these meat type animals to dual type like Barbari and Surti. Certain improvement, however, can presumably be made by the use of bucks selected on the basis of size, vigour and litter size of the mother at weaning. The Open Nucleus Breeding offers better choice.

- Artificial Insemination (AI) Centres meant for cattle are recommended to be strengthened for A.I. in goats due to semen from superior breeding bucks.

- Prolific varieties of sheep and goats identified are most valuable genetic resources and could make valuable contribution under low input system and are very special utility animals for cyclone and flood affected households

in mitigation of the disaster consequences. The conservation and development of Black Bengal goat, Kuzi and Edka breeds of sheep is vital in the interest of the community who live in coastal areas of Orissa.

- Natural vegetation on extensive range lands/ waste lands and other communal grazing areas are the major feed resources for goat and sheep in Orissa. There is however, extensive use of tree fodder. Some of the tree fodders are conserved for feeding at the time of scarcity. In some parts of the state there is a marked imbalance between the total small ruminant population and feed availability. It calls for a more urgent need to explore the efficient traditional knowledge on utilization of existing feed resources and identifying non-conventional feed resources for use during scarcity period. The Orissa University of Agriculture and Technology, Bhubaneswar has extensive research in utilization of non-conventional feed resources and requires extension to farming communities.

- High mortality in goat and sheep is of great concern. Morbidity and mortality has been the major obstacle in promoting goat and sheep production in the state. Production loss inflicting diseases and problems like foot rot, mosquito bite, tick infestation, liver flukes and contagious ecthyma need to be taken care of. In order to improve upon survivability, goat and sheep population of the state should be vaccinated regularly against important killer diseases like Peste de Petits Ruminantes, enterotoxemia, Haemorrahagic septicemia, and Blue tongue and given anthelmintic drenches for control of parasitism. Adequate cheap and effective vaccines should be made available in time along with motivation to the farmers for proper health care of their animals. Development of cheap and effective anthelmintic for use by rural people is also the need of the hour.

- It is recommended that sheep and goat farmers of the state should be given training on basic aspects of goat and sheep production with emphasis on selection of male animals for reproduction, formulation of cheap rations for goat and sheep feeding and control of major diseases of sheep and goats. There is also need to sensitize them about the marketing of goat and sheep to obtain maximum return. The training may be imparted by the veterinary officers of the Block at Panchayat level. The concept of community animal health workers can be introduced for small ruminant farming community.

Breeders associations play important role for the development and maintenance of the breeds. No such association exists in Orissa either for cattle, sheep, goat or any other domestic animals. It is therefore recommended that these associations should be formed for each breed. Cooperative societies in pattern of Amul may be formed for each breed of sheep and goat. They will play important role for recognition of the breeds for their improvement and conservation.

Regular exhibition of local sheep and goat breeds should be originated and the local breeders/ associations should be recognised to encourage them.

- Government should play a major catalytic role for development of infrastructure like NDDB to promote the neglected sector of small ruminant production as a whole with participation of communities and farmers. Extension support for health care, input supply like vaccines and market linkages should readily be available to farmers. The people/community is to be at the centre of development.

As said, 90 per cent sheep and goats are with poor people of Orissa; thus the total genetic resource is with poor. It is known that impact of various types of animal diseases are proportionately high for poor. The poor are more exposed to animal disease risk and have lesser capacity to cope with such risks than others. There is scope to build assured food security for poor by utilization and maintain appropriate small ruminant genetic resources. Again these communities are less vociferous in putting their demand to the state. NGOs should come to their help to improve their empowerment. At present the food security of poor, genetic resource conservation and development with appropriate technology supported through a strong infrastructure and market linkage is the vital objective and that can save the breeds from extinction.

The research and development needed

- To identify 'risk factors' in development and conservation of indigenous sheep and goat breeds/ populations.
- Evaluation of the technologies that are giving adverse and unfavourable cost and return in smallholder indigenous sheep and goat production. It is to be followed by socio-economic evaluation of available technologies and development of new technologies to promote rural sheep and goat production.
- Enhancing the capacity to use and develop sheep and goat genetic resources by integrating traditional and modern approaches and technologies across the full range of available production systems is most vital (Hoffmann and Scherf, 2006).
- To develop/update and standardise husbandry practices for low input smallholder sheep and goat production.
- Development of simple breeding techniques through participatory approach to bring about improvement of the local breeds. The community to be at the centre.
- To develop an extended inventory of feed resources available locally for formulation of cheap sheep and goat rations. Successful indigenous knowledge in feed and feeding to be up scaled.
- The word 'Goat' is associated with environment concern. This is a general remark. Environment concerns need to be addressed with forest officials, village committees and watersheds in-charges at local level. Right to land, water resource with people's participation and indigenous knowledge can make differences.
- To develop thermo stable sheep and goat viral disease vaccines which can be used by oral/nasal routes. It shall eliminate the cold chain dependency; especially to reach in accessible rural villages where mostly poor live.
- Development of a cost effective polyvalent Bluetongue vaccine.

INTRODUCTION

More than a billion people of the world, mostly in developing countries live in poverty. Eradication of poverty and malnutrition, therefore, has been the major concern of the world at present. The evaluation reports from a number of projects undertaken in developing countries indicate that the small animals play a significant role in poverty alleviation and enhancing gender equity among the disadvantageous communities in the developing world.

Small ruminants form a common source to which the landless, the poor and the marginal farmer including nomadic and ethnic tribal groups attach high source economic values. The new thrust on sustainable food and nutrition security gives higher priority to Small animals especially small ruminant production in food security programme.

According to FAO nearly one third of the world's livestock breeds are currently at risk of disappearing and the extinction rate stands at about six breeds per month. Small ruminant genetic resources are considered to be one of the endangered.

In developing countries small ruminants represent a diverse gene pool that could comprise unique genetic features. Due to the development in the given environment they might be better adapted to survive under harsh conditions of feeding and management. Very little effort has been made to characterize the local goat and sheep breeds especially from genetic point of view.

FAO, on the request of the global community, has started a programme for the conservation and management of farm animal genetic resources including small ruminants since 1992. The primary objective of this programme is to identify, monitor and characterize domestic animal diversity; use and develop animal genetic resources to promote productivity and sustainability in agriculture worldwide; manage genetic resources to assure long-term availability; train and involve people in management and use of animal genetic resources and communicate the world community about the importance of diversity in domestic animals.

Indo-Swiss Natural Resource Management Programme, Orissa, Bhubaneswar in collaboration with Department of Fisheries & Animal Resources Development, Government of Orissa, organised a Workshop on "Bio-diversity of Livestock in Orissa and its Role" during February 2004. During deliberations and discussions in the above workshop it was apparent that sheep, goat and poultry are of special importance for people of Orissa since most of them are non-vegetarian and meat, egg and fish constitute an important food item. Poultry meat and eggs are consumed most as they are comparatively inexpensive source of animal protein available and accepted by large sections of the society. The people, however, have a preference for chevon and mutton obtained from local goats and sheep. No systematic studies have been undertaken so far to characterize the indigenous/ local breeds of sheep and goat genetic resources available in Orissa and to assess their contribution to the farming community. The workshop, therefore recommended that the indigenous/ local breeds of sheep and goat genetic resources available in the State should be studied and characterized for their

genetic attributes at the earliest because of their importance to state's economy. This study was, therefore, undertaken to identify major indigenous sheep and goat genetic resources / local breeds of sheep and goats available in the state and to characterize them for their genetic attributes. The study was carried out in districts like Koraput, Malkanigiri, Nabarangapur, Bolangir, Mayurbhanj, Ganjam, Gajapati, Keonjhar, Puri, Khurda, Jagatsingpur, Cuttack, Balasore, Nayagarh etc. with high SC/ST population and greater concentration of local sheep and goat breeds. Since modern civilization has not made much in road into the life style of these people so far, it is likely that local sheep and goat breeds nurtured by such communities for long long time, as a means of their livelihood, are maintained more or less in pure form as before without any significant ingress of genes from other sources.

The major findings of this study are presented in this book. The book has 14 chapters, first seven of which are devoted to local goat breeds followed by seven chapters dealing with the local sheep breeds. The format suggested by FAO for description of sheep and goat genetic resources have been adopted by the contributors for describing the breed characteristics. Information has also been provided about the habitat of the breeds including a brief description of the communities responsible for the development of local breeds and their conservation.

The present publication is intended to create public awareness particularly in the current economic, environmental and socio-cultural environment and roles of sheep and goat genetic resources of Orissa.

It is hoped that this book will be able to provide much needed information on indigenous sheep and goat genetic resources of Orissa and may serve as a valuable source of reference to research workers, students, teachers, planners and administrators interested in small ruminant production and development activities.

GOAT BREEDS

BLACK BENGAL

1. General Information

Species	-	Goats
Breed/breed variety	-	Breed
Geographical location		
Distribution	-	Black Bengal goat breed is the most widely distributed in Orissa. It is the dominant breed of Western Orissa and North-Orissa tribal districts. The habitat of breed extends to coastal regions till north end of Chilika lake in Khurda district. The breed is somewhat large in size with high body weight in coastal belt near Mahanadi Muhana and dwarf with light weight in main land. However, area of the habitat has no influence on its prolificacy.
Latitude	-	17°45' – 22° 34' North
Longitude	-	81° 24' – 87°29' East
Name, Local names and	-	Black Bengal Goat. It is known as Cuttacki goats in coastal Orissa, Kasara goats in Western Orissa, also called Baigani by some people.
Information source	-	The information provided in this manuscript on Black Bengal goats was collected through a limited survey conducted in the year 2005.

2. Breed origin and development

Origin

The origin of Black Bengal goats is not definitely known but it is believed that the original native tract was Bengal which included present West Bengal, Bihar and Orissa.

Wild or primitive breed

It is an established breed of goats recognized both by FAO and ICAR.

Recent immigrations to the breed

A lot of attempts have been made to improve the body size of Black Bengal Goat by infusing blood of Ganjam and other large size goats although pure specimens of the breed are still available in several part of the state.

Population size and structure

The population size of Black Bengal goats is very large and has a very wide geographical spread. They are usually raised in smallholder production system. There is no report so far of any large organized farms. The family flock size

varies considerably from as low as 2 as high as to 60 goats. They are housed indoors in the special sheds made especially for them. They are sent for browsing separate from cattle and sheep in most of the villages. Mostly they are raised separately. In recent years, several self-help groups have been established who are rearing Black Bengal goats. When the population size is large, they appoint separate labours and send them for grazing to nearby fallow lands.

The family flocks consist of adult male and adult female goats as well as kids. When the population size is small i.e. less than 20 goats, males are not reared and are borrowed by the flock owner from neighbours for purpose of breeding. All males born are sold for meat purpose. In some of villages male goats used for breeding are treated as common property and are used for mating of goats of all the families. In such cases one male is retained for every 100 breedable females. The male kids are castrated at about 3 months of age but usually sold when they are six months of age or older.

Trend in number of females

(Increasing, stable or decreasing)

Chevon is in great demand in the State since most of the people of Orissa are non-vegetarian and meat, milk, egg and fish constitutes an important component of their daily diet. Among the meat chevon is valued most because of its taste and accepted by all section of the society. As a result the number of breeding females is increasing from year to year.

Risk status - Not at risk

Artificial Insemination usage,

Storage of semen and embryos

Mostly natural mating is used for reproduction. Instances of AI have been reported using fresh semen in Institutional flocks and primarily as trials. There is no provision yet for storage of goat semen and embryos in the State.

3. Breed Description

It is a dwarf breed with short legs, straight back, deep body and used mostly for production of chevon. The chevon is of high quality and very tasty. The skin is also of superior quality and is used for making of quality shoes. The skin of Black Bengal is in great demand both inside and outside the country.

The traits measured in the Black Bengal goats during our survey included horn length, ear length, head length, chest circumference, paunch (abdomen) circumference, neck circumference, thigh circumference, height at withers, length of the body, length of the tail and body weight. The numbers of permanent incisors were also counted. The body length was measured in two different ways, viz. length from wither to hip joint (L1) and length from hip joint to shoulder joint (L2). Data on Black Bengal goats were colleted in three different districts viz. Jagatsinghpur, Mayurbhanj and Sambalpur. The mean values for the above traits pooled over various locations are presented below in Table-1.

Coat colour

The hair coat is short and lustrous. The pre-dominant coat colours are Black, Brown, or white shaded gray. In Black variety of Bengal goats, the body

colour is jet black but some have white hairs along with nasal bones as well as white spots on the body. Brown variety has brown body with black chest and belly on their ventral surface. Some have black colour in the lower part of the feet. Most of the brown variety has a single longitudinal black strip along the vertebral column. Some have black face and in some cases the face has got two longitudinal strips of black hairs along the nasal bridge. White shaded gray goats have black colours on ventral surface of the body. Most of the Bengal goats found in Western Orissa are brown (kasara) whereas the frequency of brown coloured goats is less in coastal districts.

Table-1 Mean values for various traits measured in adult Black Bengal goats

Name of the Trait	Male		Female	
	Number of observations	Mean	Number of observations	Mean
Horn Length (cm)	66	7.4	70	8.4
Ear Length (cm)	66	12.5	70	12.8
Head Length (cm)	66	14.5	70	15.9
Chest Circumference (cm)	66	65.6	70	65.2
Paunch Circumference (cm)	66	76.2	70	82.3
Neck Circumference (cm)	66	32.7	70	31.7
Thigh Circumference (cm)	66	24.1	70	22.2
Height at withers (cm)	66	57.2	70	56.1
L1 (cm)	66	46.1	70	46.9
L2 (cm)	66	52.1	70	51.7
Tail Length (cm)	66	10.8	70	11.9
Body weight (kg.)	66	23.8	237	20.6

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

Ear & Head

Ears are upright and pointed and medium in size. Head is straight or slightly depressed and usually of same colour as that of the body. The mean values for length of ear varied from 11.5 to 14 cm. in different locations. Similar variation was observed for the length of head. Mean head length varied from 14.2 cm. to 15.8 cm. in different locations (Table-1). The face is small with straight or slightly depressed profile.

Number and description of horns

Both males and females have horns. Horns were usually small and stumpy, directed upward and backward, although variation was observed in few of the goats. The mean length of the horn ranged from 5.6 cm. to 11.7 cm.

Hair and wool type

The hair coat is short and lustrous in all the varieties; small and lustrous black in black variety and brown or mixed black and brown in others. Tail hairs are longer than body hairs. The hairs on the thigh region of the leg are also long. Males have slightly longer hairs than the females and this is pronounced in all parts of the body.

Body size and weight

The black Bengal goats are small in size with average body weight of 11 to 15 kg. for males and 8 to 13.5 kg. for female goats. Sometimes the weights may go upto 23 to 24 kg. (Sahoo, 1985). Patnaik (1984) reported the average body weight of Black Bengal goats as 11.5 kg. at 12 months, 15 kg. at 18 months and 16.7 kg. at 24 months. No other reports of body weight for Black Bengal goats is available in the State of Orissa although there have been several reports on body weight of Black Bengal goats in other State. Bhat *et al.* (1981) reported body weight of 14 to 16 kg. for adult bucks and 9 to 14 kg. for adult does based on data reported in literature for Black Bengal goats in the country. In our study the average body weight of adult Black Bengal goats varied from 19.7 kg. at Mayurbhanj to 24.2 kg. at Jagatsinghpur for adult does. The body weight of adult does at Sambalpur was 20.1 kg. The average body weight for adult bucks was 24.3 kg. at Mayurbhanj. This data on adult bucks could not be collected at Sambalpur and Jagatsinghpur since young bucks are preferred for breeding and bucks above one year of age are usually sold in the market for chevon. However bucks with two teeth attained body weight of 20.2 kg. at Jagatsinghpur.

Tail

Tail is medium in size, directed upwards and covered with slightly longer hairs. The average tail length varied from 9.0 cm to 12.5 cm. in different districts.

Reproduction

Males mature early than females and they are ready to serve at about six months of age. The males and females are maintained in ratio of 1:30 or 1:50. The Black Bengal goats breed throughout the year. The kids are not sent for grazing along with the mothers till two months of age, consequently they suckle their mothers in the morning or when they comeback in the evening. Weaning is not practiced as a result the kids go on suckling their mothers till the next kidding.

It is a prolific breed of goat with highest ovulation rate (4%) known for any caprines in the world (Rao and Bhattacharya, 1979). Goat farmers claim to have two kiddings in twelve to fourteen months. More than 60 per cent of goats give birth to twins, 5 to 10 per cent to triplets and rest to singles. Quadruplet birth has also been recorded in the breed. The first heat occurs around 8 to 9 months of age and first kidding at about 14 months of age. The inter-kidding interval varies from 6 to 7 months. The does come in heat and is bred in one month after kidding.

The surplus males are castrated at about 3 months of age and disposed of any time thereafter although most prefer to sell when they are more than six months old.

Both udder and teats are medium in and shape of the udder is round. The but Black Bengal goats are good milkers and support twins and triples. The average milk yield per day varies from 250 to 400 g. per goat per day and the lactation length averages three months.

The common diseases of Black Bengal breed of goats remain more or less same as those of other goat breeds and includes PPR, pneumonia, pneumo-enteritis HS, coccidiosis, contagious ecthyma, enterotoxaemia, foot rot, Goat

pox, FMD, nutrition deficiency and Ecto and Endo-parasitism. The common nematodes are *H. contortus*, and *T. Ovis*. The common trematodes are liver flukes and amphistosomes. The kid mortality is high and is about 20%. Adult mortality is also high (20 per cent) which includes mortality from diseases as well as from predation and theft. Lack of vaccination against PPR and other communicable diseases usually result in pandemic and cause heavy mortality. Vaccination is practiced at present but not regularly, since the goat keepers are illiterate and availability of vaccine at the time of need is a problem. Similar is the case for control and prevention of parasitic diseases.

Genetic Characteristic

No studies have been conducted so far in Orissa.

4. Breed uses and special qualities

Main uses

Both the males and females of this breed are primarily used for production of meat. The average milk yield varies from 250 g. to 800 g., which is just sufficient for the kids. However, in case of any eventuality leading to death of the kid the goats are milked. Some farmers also milk the goats after the kids are 3 months of age. The skin fetches a good price because of its high demand both inside and outside the country. Goat manure is used for crop and vegetable fields and flower beds. Black Bengal goats are often used for ceremonial purposes and sacrifices by almost all the communities.

Special qualities

The Black Bengal goats are highly adapted to the environment in which they live. They are relatively resistant to gastrointestinal parasitic infestations. They have strong flock habbit and can stand to moist soil. The breed is good in grazing grass around roadside, cannal and bunds.

5. Management Conditions

Type of management

Black Bengal goats are patronized by poor sections belonging to all communities. They are raised in smallholder production system with family flock size varying from as low as 2 to as high as 60 and sent for grazing along with other farm animals like cattle and sheep. They are also raised separately depending upon the availability of the family labour. They are provided shelter whenever they stay at home. When the flock size is fairly large separate houses are constructed for keeping of goats. In undivided Koraput district, keeping of goats on raised platform houses is very common. Black Bengal goats browse their feed requirements when they are sent outside along with other animals. Very rarely additional feed is provided at home. However, branches and leaves of several trees like *Seema-Kaina, Neem, Aswastha, Kantei Koli, Bhaincha Koli, Bara Koli etc.* available in the locality are given to the goats. Common salt is given usually once in a month. They usually drink water outside while grazing

The supervision of animals varies from one farmer to the other. Goats are supervised atleast once during the day. In recent years raising of male castrated goats has become a good business and several farmers in coastal district prefer to raise males than females as castrated males fetch a better price compared to other goats especially for meat as castrated males do not have typical goaty smell generally emitted by uncastrated males.

The kid mortality is about 20%. The common causes for kid mortality are poor growth due to inadequate milk production, pneumo-enteritis, pneumonia and predation. The adult deletions amount to 10% and are due to diseases, predation and theft.

6. Performance trait information

Estimates of genetic distances from other breeds

No information available from Orissa.

Analysis of genetic material

Not available.

Description of conservation Programme in operation

The population and spread of Black Bengal goats is very large and hence no programme for preservation of breed is necessary at present. There is enough genetic variance available in the breed. Selection will be very effective to bring about improvement. Inbreeding should be kept to minimum while selecting.

BLACK BENGAL GOAT

Black Bengal does, Puri district

Black Bengal Flock, Khurda district

Bengal Small Holder Flock , Sundargarh district

Bengal Buck, Sundargarh district

Bengal doe, Bolangir district

Bengal doe, Khurda district

Bengal doe with triplets, Bolangir district.

Black Bengal Small Holder Flock, Puri district.

Black Bengal young buck

Bengal Buck, Mayurbhanj District

Bengal Goat, Sambalpur

Super Cyclone Devastation of Coast Orissa, 1999.

BADA VIHAN

1. General Information

Species	-	Goat
Breed/breed variety	-	Breed
Geographical location		
Distribution	-	Mostly found in Nayagarh district and southern parts of Khurda district or Orissa.
Latitude	-	20° - 22°15' North
Longitude	-	84° - 85°30' East
Name, Local names and	-	Badavihana. It is also known as Dorangi in Nayagarh since most of the goats exhibit its two colours. The other way may be due to two breed cross.
Information source	-	The information provided in this manuscript on Badavihana goats was collected through a limited survey conducted in the year 2005-06.

2. Breed origin and development

Origin

The breed has been developed during last twenty years by crossing of Black Bengal does with Ganjam bucks and subsequently inter-breeding of crossbreds coupled with selection.

Wild or primitive breed

It is an indigenous breed of goat developed by the farmers of Nayagarh and Khurda districts.

Recent immigrations to the breed

Not reported. Probably breeding of Black Bengal goats with bucks of Ganjam goat continues and resultant crossbred individuals are constantly infused into this breed.

Population size and structure

The population of Bada vihana goat is fairly large and may exceed to 50,000. It is mostly raised in smallholder production system, goat farming integrated with crop production. These goats are increasingly patronized by the self-help groups because of large body size and higher meat yield. The family flock size varies greatly from as low as 5 to 6 to as high as 30. The family flocks usually have of 1-2 breeding bucks. The male to female ratio is usually maintained at 1:20 to 1:30. Young bucks are preferred for mating than older ones. Very rarely bucks of more than 3 years of age are used for breeding.

Trend in number of females

(Increasing, stable or decreasing)

There is a big demand for chevon in all parts of Orissa. As a result the goat population is on increase over the years and consequently the number of breeding females.

Risk status - Not at risk

Artificial Insemination usage,

Storage of semen and embryos

Not practiced so far.

3. Breed Description

The mean values for various traits measured in Bada vihana goats are presented in the table-2.

Coat colour

The coat colour varies widely. The coat colour of the flocks involved in this study had black, brown, mixed black and brown with some white patches in some goats.

Table-2 : Mean values for various traits measured in Bada vihana goats

Name of the Trait	Male		Female	
	Number of observations	Mean	Number of observations	Mean
Horn Length (cm)	22	17.2	52	11.4
Ear Length (cm)	22	13.2	52	13.3
Head Length (cm)	22	25.7	52	19.9
Chest Circumference (cm)	22	67.7	52	65.8
Paunch Circumference (cm)	22	74.7	52	80.2
Neck Circumference (cm)	22	37.7	52	33.7
Thigh Circumference (cm)	22	39.2	52	34.5
Height at withers (cm)	22	67.2	52	64.7
L1 (cm)	22	52.0	52	49.2
L2 (cm)	22	58.0	52	57.1
Tail Length (cm)	22	14.3	52	13.3
Body weight (kg.)	22	27.0	220	24.4

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

Ear & Head

Head is larger in males than females. Ears are medium to large in size and mostly drooping although in few of the individuals they were horizontal or straight. The head is straight with slightly convexity in the middle above nasal septum. The mean values for head length varied from 8.5 to 18.5 cm. in males and 11.3 to 17.0 cm. in females in the samples measured. Wattles are present in 10% individuals and beard in less than 5%.

Number and description of horns

Horns are present in both the sexes. When the horns are small, they are usually straight and extend angularly upward and sideward. The long horns mostly found in males are curved inward.

Hair and wool type

Hairs are usually short. Long hairs were seen in the neck, in tails and also in thigh region.

Tail

Tail is small and thin. The tail length in adult goats varied from 8 to 17 cm. The mean values for tail length was 14.0 cm.

Body size and weight

Bada vihana goats are larger in size than the Black Bengal goats but smaller than Ganjam goats. Body weight increases with age. Males are heavier than females at all ages recorded in the study. The mean values for adult body weight was 24.4 kg. in females and 27.0 kg. in males.

The udder size in she goats varies from small to medium so also the teats. The goats are usually not milked since milk is adequate enough just for the kids.

Reproduction

The females come in heat at about 12 to 15 months of age. Sixty per cent of the goats give birth to twins. Farmers claim that they get 3 kidding in a period of two years. Consequently the inter-kidding interval is around 8 months. The first kid is born when the goats are about 1.5 year of age.

The bucks are selected based on their phenotypic appearance, vigour and size. All the does are selected for breeding except those which are unable to reproduce or are in poor condition; usually no selection is practiced in females. Mating is random after the selection of males. Usually young bucks are used for breeding purpose. This was consistently observed in all the areas surveyed. The male to female ratio in the flock varies from 1:20 to 1:30. There is no exchange of males between the farmers. However, families having small flocks, use the breeding males taken from the neighbours by paying small charge.

The males, which are not required for breeding are castrated and sold when they fetch a good price. The body of these bucks does not emit bad odour.

Genetic Characteristic

No studies have been reported so far.

4. Breed uses and special qualities

Main uses

The Bada vihana breed of goats are used mostly for production of meat (chevon). Manure and skin are also of high economic value.

Special qualities

They appear to be well adapted to their habitat and can survive scarcity of feed and are fairly resistant to gastro-intestinal parasites and relatively more resistant than Ganjam and Black Bengal goats for most of the common goat diseases is reported by farmers.

5. Management Conditions

Type of management

Bada vihana goats are raised in small holder production system and usually go for grazing along with other animals viz. cattle and sheep. When the village has large number of goats, the goat farmers join together and appoint a

labourer to take care of the goats. In such cases goats are taken separately to nearby forest areas and other fallow lands for purpose of grazing during the day and come back to their homes in the evening. The houses are made of materials like wood, bamboo, mud etc. available locally. Well to do farmers provide better houses for shelter than poor farmers. However, attempt is made by all the goat owners to construct the house in such a manner which will protect the goats from predation of wild animals and inclement weather. This is mostly seen in the villages located within or near the forest area. Most of the people do not give any supplemental feed. The kids are raised at home upto 2 months of age after which they are allowed to go in the flock along with their mothers for browsing. As the kids are not separated from their mothers as such the kids go on suckling till next kidding. The goats drink water outside if available. Otherwise water is provided at home. Most of the farmers give common salt to the goats for licking every 15 days. Predation is a major problem in some of the villages.

The most common diseases are PPR, contagious Ecthyma, entero toxemia, foot rot, Goat Pox and FMD. Endo parasitic infestations are also encountered. Vaccination of the goats to protect them from major diseases is practiced by a large number of farmers. Non availability of vaccine in time against PPR has caused heavy losses in the recent past.

6. Performance trait information

Estimates of genetic distances from other breeds

No information available.

Analysis of genetic material

Not available.

Description of conservation Programme in operation

It is a newly developed breed of goat and has become very popular. Because of its good performance, the number of the individuals in the breed is increasing over the years. Hence major emphasis should be on selection of bucks based on their weight and size and survival of the litter in which they are born.

BADA VIHANA

Bada Vihana buck, Nayagarh district

Bada Vihana Flock, Nayagarh district

Bada Vihana Buck, Nayagarh district

DALUA

1. General Information

Species	-	Goats
Breed/breed variety	-	Breed
Geographical location		
Distribution	-	Found in the Chilika coast of Rambha & Khallikote Blocks of Ganjam district, Orissa, India.
Latitude	-	18°0′ – 20°0′ North
Longitude	-	84°0′ – 85°15′ East
Name, Local names and	-	Dalua Goat. The local name is Dalua since these goats feed on branches of trees found on the coast of Chilika lake. In the local language the branch is known as Dala and hence the name Dalua. It is also called as 'Lenka chelli'.
Information source	-	The information provided in this manuscript on Dalua goats was collected through a limited survey conducted in the year 2005.

2. Breed origin and development

Origin

This breed of goat is patronized primarily by Golla community inhabiting the Chilika coast of Rambha and Khallikote Blocks of Ganjam District of Orissa since long. Although the origin of the breed is not definitely known, Ganjam goats may have been responsible for evolution of this breed as there are lot of similarities on both the breeds in respect of physical/ conformation characteristics and performance traits between Ganjam goats and Dalua goats.

Wild or primitive breed

It is an indigenous breed but is known to have been derived from the Ganjam breed, which is a recognized breed of goat in this region.

Recent immigrations to the breed

Not reported.

Population size and structure

The population of Dalua goats inhabiting Coast of Chilika Lake is estimated to be 20,000. They are raised in smallholder production system. The flock size varies considerably from as low as 20 to 25 goats to as high as 200. Several families join together and raise goats in flocks to reduce the cost of rearing. The flocks are semi-nomadic in nature and move from place to place in search of browsing resources within a limited area in the vicinity of the residence of the owner. Throughout the year they live in open area near the house of the owner unlike Ganjam goats which live away from home and are mostly kept in fields. While some of the families provide cover to protect their flock from sun and rain, in other families they are raised in open enclosures to

prevent straying and predation.

The family flocks consist of adult male and female goats as well as kids. The ratio of males to females varies from 1:20 to 1:25. Extra males are disposed of at about one year of age. The disposed males are not castrated. Due to this reason just like Ganjam goats, meat and milk from Dalua goats also give goaty smell.

Trend in number of females

(Increasing, stable or decreasing)

The demand for animal products like meat, milk and egg is on an increase over the year in recent past and since goat meat is delicious and accepted by all non-vegetarian sections of society. The goat population is increasing from year to year. As reported by livestock census the goat population has increased more than four folds during the last forty years due to increase in demand for goat meat. As a result the number of breeding females is on an increase over the years.

Risk status - Not at risk

Artificial Insemination usage,

Storage of semen and embryos

Not practiced so far.

3. Breed Description

The traits measured on Dalua goats during our survey included horn length, ear length, head length, chest circumference (CC), paunch (abdomen) circumference (PC), neck circumference (NC), thigh circumference (TC), height at withers (HW), length of the body (L) and body weight (BW). The numbers of permanent incisors teeth were also counted. The mean values for these traits are presented in Table-3.

Coat colour

The predominant coat colour is black and more than 90 per cent of Dalua goats conform to this colour. Rest 10 per cent of goats have brown and brown and black mixed colour. The luster and intensity of black or brown colour varies from individual to individual, although jet-black and dark brown coat colours are more in frequency than light colours.

Ear & Head

Ears are fairly large and slightly dropping. Head is generally straight or slight convex and is of same colour as that of body. The head length varied from 19 to 29 cm. in males and 22 to 23 cm. in females whereas ear length varied from 10 to 13 cm. in males and 12 to 15 cm. in females. The average head length was 24 cm for males and 22 cm. for females. The average ear length was 12 cm. for males and 14 cm. for females. Beard is absent in both the sexes. Wattle is also absent, except in rare cases.

Number and description of horns

Both males and females have horns. Horns are usually big in size and extend backward and upward. In some individuals the horns are semi-curved. Farmers like long horns, so pay attention at selection also.

Hair and wool type

The hairs are usually short in length, lustrous and black in colour in black variety and brown or mixed black and brown in others. Tail hairs are longer than body hairs. In some goats the hairs on the thigh region of the leg were also long. Males have slightly longer hairs than the females and this is seen in all parts of the body.

Adult size and weight

Dalua goats have a large frame of body and long legs as those of Ganjam goats but the later has their legs and thigh. The legs are placed well apart from each other. They are as tall as Ganjam goats. The body size of adult Dalua goats, according to sex, has been presented in the table given below. Study revealed that the males are heavier in body weight than the females and also superior to females in chest circumference, neck circumference, thigh circumference, body length and height at withers.

Tail

Tail is thin, medium in length, and covered with long hairs. Average tail length was found to be 13.5 cm in males and 15 cm in females on the samples measured.

Reproduction

Males mature early than females and they are ready to serve by about one year of age. Usually young males of 2-3 years of age are used for breeding purposes. As stated above the males and females are maintained in ratio of 1:20 or 1:25. There are two principal breeding seasons. One is during September and October and the other during March and April. The kidding during the month of March and April is not preferred since the availability of adequate feed is a problem. As a result the kids do not grow well and have high mortality in monsoon rains. The goats are taken for grazing either separately or along with sheep to nearby areas. The kids are not sent outside and they suckle their mothers in the morning or when they comeback in the evening. Weaning is not practiced as a result the kids go on suckling their mothers till the next kidding.

The first heat in females is usually observed at about 24 months of age and the first kidding occurs when the does are 27-30 months of age. The inter-kidding interval is around one year however in some does there are three kiddings in a period of two years. Twin birth is very rare. More than 90% of the goats give birth to singles.

The extra males are not castrated and are sold when they are more than one year of age. Keeping of more males in the flock without castration imparts goatish smell to meat and milk.

Both udder and teats are usually small but medium size udder and teats were seen in a few goats. The average milk yield is about 300 g. per goat per day and lactation length is around 5 months. The owners do not milk the goats since milk is just adequate for maintenance of the kid. When the kids are about 3 months of age, some farmers milk the goats and provide alternate feed to the kids.

Table-3 : Mean values for various traits measured in Dalua goats

Name of the Trait	Male		Female	
	Number of observations	Mean	Number of observations	Mean
Horn Length (cm)	14	27.0	55	21.2
Ear Length (cm)	14	11.5	55	13.5
Head Length (cm)	14	24.0	55	21.3
Chest Circumference (cm)	14	79.0	55	78.3
Paunch Circumference (cm)	14	85.5	55	83.8
Neck Circumference (cm)	14	47.5	55	40.0
Thigh Circumference (cm)	14	53.5	55	39.5
Height at withers (cm)	14	75.5	55	76.0
L1 (cm)	14	54.0	55	53.3
L2 (cm)	14	61.2	55	60.9
Tail Length (cm)	14	13.5	55	15.8
Body weight (kg.)	14	41.0	180	35.3

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

The common diseases of Dalua breeds are similar to those occurring in other goats breeds and includes PPR, Pneumonia, HS, Coccidiosis, Contagious Ecthyma, Enterotoxemia, Foot rot, Goat pox, FMD, Pneumo-enteritis, Nutritional deficiency and Ecto and Endo-parasites. The common endo-parasite are nematodes like *H. contortus*, and *T. Ovis*. The common trematodes are liver flukes and Ruminal flukes. The kid mortality is high (20%). Adult mortality is also high (20%), which includes mortality both from diseases as well as from predation and theft. Lack of vaccination particularly against PPR usually result in pandemic and cause heavy mortality. Vaccination is practiced but not regularly, since the goat keepers are illiterate and availability of vaccine at the time of need is a problem. Similar is the case for control and prevention of parasitic diseases. The Golla people use indigenous medicines for containing diseases, besides worshipping goddesses. Recently they have realized that the system of medicine they practice is not adequate enough for control of infectious diseases, but action is still lacking due to their social empowerment and lack of adequate extension system. They are unorganized.

Genetic Characteristic

No studies have been conducted so far.

4. Breed uses and special qualities

Main uses

Both the males and females of this breed are primarily used for production of meat and rarely for production of milk. The average milk production is about 500 g. per day which is just sufficient for the kids. However, in case of any eventuality leading to death of the kid, the goats are milked and the milk is used for making ghee and used by the owner. The community raising these

goats does not sale milk since ghee is sold at a premium price. The skin also fetches a good price. Goat manure is considered to be very good for crop and vegetable fields. Dalua goats are made to sit on different fields during night for monetary consideration from landowner. For night sitting of 100 goats about Rs.30/- is received per night. The penning season is from beginning of December to end of May when there is no rain and no crop is growing on the land when sheep and goat are penned during night but go for grazing to nearby forest or other grazing area during day.

The Dalua goats are of special significance to the Golla community as they earn their living from sale of sheep/goat and use various socio-cultural purposes besides gift and sacrifices.

Ladies play an important role in marketing of the products like milk and ghee. They also fix the rates for the products they market. Sale of live animals, however, is done by men.

Special qualities

These goats have been raised by the Golla community since long without any vaccination and administration of medicines for control and treatment of diseases. Vaccination against important goat diseases and use of anthelmintic against internal parasites is a recent phenomenon. Inspite of this, the goat population has increased over the years. This suggests that the Dalua goats are relatively more resistant to most of the goat diseases. They are well adapted to high ambient temperature and humidity and other adverse climatic conditions of their habitat and continue to survive and reproduce.

5. Management Conditions

Type of management

Dalua Goats are patronized by Golla community. They primarily depend on sheep and goats for their livelihood. The average flock size per family varies from as low as 20 to 25 goats to as high as 200 goats. Several families join together for purpose of rearing goats and appoint common labourers for reducing the cost of goat production. At present they are paying about a thousand rupees per month for 200 goats and the number of labourers depends upon the flock size. Each family contributes to this purpose depending upon the number of animals. These goats are raised in the open near the house of the owner, rarely a cover is provided. The kids are kept in the owner's house and not sent for grazing. They suckle their mothers only during morning as well as evening. The sick goats are kept separately and given special care. The favoured plants for browsing of these goats include *Seema-Kaina, Neem, Tentuli, Aswastha, Kantei Koli, Bhaincha Koli, Bara Koli etc.* No other supplemental feed is provided throughout the year. Similarly the mineral supplements are not given except common salt. Common salt is given usually once in a month. The flocks are raised in a semi-nomadic manner and move from place to place in search of browsing materials within limited distance from the village. These goats usually drink water from ponds/rivers/streams available in the browsing area. No additional water is provided.

Mating is random. The males available in the flocks are usually used for mating with the females. Once in two years, the males are exchanged between the flocks to reduce in breeding. About 80% of the goats give birth annually.

The Golla owners supervise their flocks at least once during the day to observe the conditions of their flock, for suckling of the kids and for collection of milk if any.

The kid mortality is about 20 per cent. The common causes for kid mortality are inadequate milk availability, pneumo-enteritis, pneumonia and predation. The adult mortality is around to 20 per cent primarily due to predation and theft. Diseases also play a role in causing mortality.

6. Performance trait information

Estimates of genetic distances from other breeds

No information is available.

Analysis of genetic material

Not done due to lack of facilities.

Description of conservation Programme in operation

The population of Dalua goats is fairly large at present and is increasing from year to year. No conservation and improvement programmes are in operation.

DALUA GOAT

Dalua Buck and doe Khalikote, Ganjam district

Dalua doe, Khalikote, Ganjam district

Dalua Doe, Diagaphandi, Ganjam district

Dalua Buck, Digapahandi, Ganjam district

Dalua doe, Diagaphndi, Ganjam district

Dalua buck and doe, Ganjam district

GANJAM

1. General Information

Species	-	Goats
Breed/breed variety	-	Breed
Geographical location		
Distribution	-	Ganjam, Gajapati, Rayagada, Khurda & Nayagarh districts of Orissa. However, mostly concentrated in Chhatrapur, Rambha, Bhanjanagar and Tangi areas of the State
Latitude	-	17°48' – 22° 34' North
Longitude	-	81°24' – 87°29' East
Name, Local names and Synonyms	-	***Ganjam*** Locally known as Golla goats since this breed is mostly patronized by Golla community living in Orissa and Andhra Pradesh.
Information source	-	The information provided in this manuscript on Ganjam goats was collected through a limited field survey conducted in the year 2005-06 .

2. Breed, origin and development

Origin

The breed derives its name from the name of the district "Ganjam" of Orissa in which it is widely distributed. In the past Ganjam district included Srikakulam district of present Andhra Pradesh.

Wild or primitive breed

It is an established breed of goat, recognized both by the FAO and the ICAR.

Recent immigrations to the breed

There has been no induction into the breed of any other indigenous/exotic breed for the improvement, since Golla community wants to maintain the breed in its present form.

Population size and structure

The total population of Golla goats in Orissa is around 100,000. The goats are maintained in flocks varying from few hundreds to few thousands animals, although the number of goats per family varies widely from as low as 50 to as high as 200. Several families join together and raise the goats in large flocks, which help them to reduce the cost of rearing. A family flock usually consists of adult bucks, does and young stock. Male to female ratio is usually maintained at 1 : 5 to 1:10. Extra males are disposed of around 1 year of age. All the females are retained for breeding purpose except those which have stunted growth and do not reproduce. The kids are generally raised at home of the

owner but are taken to the grazing area during noon for suckling their mothers.

Trend in number of females

(Increasing, stable or decreasing)

Due to increased in demand for animal protein the demand for goat meat is on increase, since it does not have any religious or cultural taboo. So the numbers of breeding females are increasing over the years.

Risk status - Not at risk

Artificial Insemination usage,

Storage of semen and embryos - Artificial Insemination has not yet been practiced.

3. Breed Description

Ganjam goats are leggy so tall but medium in size and mostly used for production of meat. The skin is of superior quality and sold at a premium price. Traits measured in Ganjam goats for describing its breed characteristics along with their means are presented in Table-4.

Coat colour

The predominant coat colours are black and dark brown although goats with white or spotted colour are encountered.

Ear & Head

Ears are medium in size and mostly pendulous. Head is straight in females and slightly convex in males.

Number and description of horns

Horns are present in both the sexes. They are usually long, flat and directed upward and backward and may be curved both clock-wise and anti-clock-wise, the pattern varying from one animal to other. Straight horns are also seen.

The average horn length is 37 cm in adult males and 26 cm in adult females in the flock of goats measured in Pannuagoan of Ganjam district. The average length of horns was 35 cm in males and 29 cm in females in Tangi and Pannuagaon and 37 cm in males and 28 cm in females in Paralakhemundi area.

Hair and wool type

The hairs are usually short although long hairs were encountered in the neck and near the thigh region of the hind legs. Most of the males have wattles, whereas these are absent in females. Length of the wattles varies from 8 to 10 cm. Clipping of hair is not practiced in male goats; however the female goats are shorn after each kidding to facilitate suckling of kids and draw milk for human consumption.

Body size and weight

The mean values for adult body weight of Ganjam goats are presented in Table-4. Males were heavier than females. The average body weight of adults in the samples measured was found to be 41.5 kg. for males and 37.6 kg. for females. Males were also superior to females for chest and abdomen girth, height at withers, body length, neck and thigh circumferences. Ganjam goats are currently studied at OUAT, Bhubaneswar under AICRP Goat breeding. The

mean values for body weight at birth, 3 months, 6 months and 12 months of age for male and female goats of Ganjam breed under farm conditions were reported by Patro and Rao (2004). The mean values for birth weight and weight at 3, 6, 9 and 12 months of age respectively were 2.36, 7.35, 9.87, 11.57 and 12.63 kg. in males, and 2.25, 6.87, 9.07, 10.89 and 11.46 kg. in females. At all ages of measurement the males are heavier than females.

The measurable traits like body weight, length of the body, height at withers, heart girth etc. increase with age up to 2 ½ to 3 years.

Table-4 : Mean values for various traits measured in Ganjam goats

Name of the Trait	Male		Female	
	Number of observations	Mean	Number of observations	Mean
Horn Length (cm)	52	32.5	60	23.3
Ear Length (cm)	52	14.2	60	14.5
Head Length (cm)	52	26.5	60	24.0
Chest Circumference (cm)	52	83.9	60	78.9
Paunch Circumference (cm)	52	91.0	60	87.1
Neck Circumference (cm)	52	46.9	60	38.1
Thigh Circumference (cm)	52	40.2	60	39.3
Height at withers (cm)	52	83.0	60	78.0
L1 (cm)	52	56.3	60	55.0
L2 (cm)	52	63.5	60	59.5
Tail Length (cm)	52	18.4	60	16.1
Body weight (kg.)	52	45.1	180	37.6

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

Tail

Tails are longer in males than in females. The average tail length on samples measured was 18.4 cm. in males and 16.1 cm. in females

Reproduction

Males mature early than females and ready to serve by about one year of age. The first heat in females is usually observed when they are more than 2 years of age. Single birth is more common and is preferred by the goat owners.The does yield about 400 g. of milk per day which is not sufficient to raise more than one kid. The lactation length varies from 5 to 6 months. Twenty to 30 per cent of the does give birth to twins. The Golla farmers prefer to raise kids from does who gives single kid per birth and cull out multiple births from the flock. Under farm condition, the goats mature early about one and half year of age whereas the first kidding occurs around 2 years of age. The kidding interval is generally one year although two kidding within a period of 15 months have been reported. The udder is small and so also is the length of teats.

There are two principal breeding seasons, one during September and October and the other during March and April. The second breeding season is not

preferred since enough natural vegetation is not available for browsing and consequently the milk production decreases resulting in stunted growth and higher mortality in kids. Gollas' claims 8 days breeding cycle for Ganjam goats in each of the two breeding seasons. Those which do not conceive in one of the breeding season come to heat again and are bred.

Castration of males is not practiced and since males stay mostly with females, both the meat and milk have goaty smell which is not liked by the consumers.

The farmers are ignorant about the laws of the inheritance but by virtue of experience they know that selection for long horns, tallness and against single kidding and exchange of males between flocks will bring about improvement.

The goats are not shorn as the hair is of little economic value.

Genetic characteristic

Not available.

4. Breed uses and special qualities

Main uses

The Ganjam goats of both the sexes are primarily used for meat (Chevon). Since the does are poor milk producers, very little milk is available for sale. Whenever any surplus milk is there, it is used for production of ghee which is claimed to have a medicinal value and is sold @ more than Rs. 500/- per kg. and in lean seasons it may be as high as Rs.800/- per kg. The skin is next to ghee in its economic importance. Goat manure is good as fertilizer as it contains all the nutrients for manuring of crop fields and vegetable gardens.

Special qualities

Until recent years raising of the Ganjam goats was done by the Golla community without any assistance or application of prophylactic measures. Vaccination of the animals for control of infectious diseases and administration of anthelmintics for control of endo-parasites was never practiced. It is therefore presumed that the goats of this breed are relatively resistant to most of the goat diseases which includes bacterial, viral, parasitic etc. They are known to be resistant for Contagious Ecthyma than Black Bengal goats. However, higher incidence of Hydatid cysts in Central Nervous system has been reported. These goats are well adapted to their environment and survive and reproduce normally in high ambient temperature and humidity encountered in their habitat. The farmers claim that the breed has strong resistance to withstand heavy rainfalls under open forests management.

5. Management Conditions

Type of management

Ganjam goats live in flocks varying in sizes from few hundred to few thousands. Usually several residents of a village join together and raise their goats together which helps in reducing the cost of raising. Ganjam goats move from place to place in search of browsing material. Most of the flocks are raised near a forest for easy availability of shrubs and trees for browsing. They live in open

irrespective of rain or sun and appear to be well adapted to high ambient temperature, humidity and heavy rains. Kids are however generally raised in the owner's home and are taken to the flock during the day for suckling. The kids are never separated from their mothers as such they go on suckling the mothers till next kidding. No additional feed is provided except browsing on natural vegetation. The flocks sit in fields after harvesting of crops from November to June every year in rotation from field to field and earn handsome amount from this practice. We were told that penning of 100 animals in a field fetch the owner of the flock from Rs.30/- to Rs.50/- per day.

Moving of individuals from one flock to another is very limited resulting in high degree of inbreeding. In recent years bucks are exchanged among flocks to reduce in-breeding coefficient. This has helped in improvement of the performance. The Golla goats have become bigger in size and heavier in weight due to this practice followed in recent years. The Golla community is basically a crop farmers although they raise goats traditionally in a semi-nomadic manner and move from one place to another within a limited territory.

The Ganjam goats are browsing type and move from one place to another in search of browsing and to drink water of streams/ponds/rivers depending upon their availability. The trees browsed upon vary from locality to locality. The common shrubs/trees they browse include, *Aswastha, Mai, Kasi, Jui, Phering, Vaincha, Kanteikoli, Arakha, Gambhari, Panichia Lai, Gua Koli, Bara Koli, Sal, Cashew fruits and Tamarind, Seema Kaian, Keli Kadam* etc.

The major weakness of their system of management is keeping up large number of uncastrated males and selling them at late age. Although they are proud of their system of management, it is a vice rather than virtue since the milk and meat emit goaty smell and more expenditure is committed for labour and fodder.

The breed is hardy to withstand open housing throughout the year; so also the Golla shepherds who live with the flock. Few dogs accompany the shepherds and flock, and give protection from wild life. Often disputes do appear with forest and social forest personnels due to shortage of grazing area. They use few indigenous plant medicine for wounds and maggot wounds; but nowadays depend upon modern system of health care to protect their animals.

The Golla community follow strictly the rules of cooperative labour sharing and earning livelihood. The young generation is literate.

Predation from wild animals including wild dogs is a problem since most of the flocks are raised within or near a forest. Mosquitoes also are a source of annoyance and cause unrest to the flocks consequently affecting their performance. The shepherds also report the problem.

The common diseases encountered in this breed of goats include, PPR (Peste de petits ruminantes), pneumonia, HS, Coccidiosis, contagious ecthyma, enterotoxaemia, foot rot, Blue tongue? Goat pox, FMD, pneumo-enteritis, enteritis. Ecto and Endo-parasites etc.. The common endo-parasite, are nematode worms like *H. contortus, T. Ovis,* etc. The common trematodes are liver flukes and amphistomes. The kid mortality is high and varied from 20 to

30% in different flocks studied during the investigation. The loss of adult animals include predation and theft beside diseases which may go upto around 20%. The Ganjam goats are vaccinated against PPR, HS and FMD. They are also given anthelmintic drenches. This has reduced the mortality to almost nil in flocks, which are practicing modern methods of disease control.

6. Performance trait information

Estimates of genetic distances from other breeds

Not studied during this investigation.

Analysis of genetic material

Not done in this investigation. Some work is in progress in OUAT.

Description of conservation Programme in operation

Since the size of the population is fairly large exceeding more than hundred thousands and widely distributed in Orissa and Andhra Pradesh coastal areas, no conservation programme is under operation.

GANJAM GOAT

Ganjam Goat, doe, Rambha, Ganjam district

Ganjam Kids and Lambs at Home

Ganjam Goat Flock in Forest, Rambha, Gajam district

Ganjam doe with Kid in Forest, Ganjam district

Ganjam Goat, Buck

Golla Shephards enjoying meal in forest

Ganjam breed doe, proud owner

Ganjam doe with long horns and wattles

Golla Shephard making a doe

Golla shephard taking lunch in the forest

feeding milk to a newborn weak kid.

Golla shephard with his Flock

A Co-operative Golla Flock, Ganjam

Ganjam doe, Paralakhemundi

Beard and long horns of Ganjam Buck

Ganjam Flock Sitting in field, kids separated in bambo boxes

Ganjam Kids and Lambs at home

Ganjam Goat flock in forest

MALKANGIRI

1. General Information

Species	-	Goats
Breed/breed variety	-	Breed
Geographical location		
Distribution	-	Widely distributed in Malkangiri District, Orissa
Latitude	-	17°85′ – 18°45′ North
Longitude	-	81°0′ – 82°30′ East
Name, Local names and	-	Malkangiri syn. Koyachelli
Information source	-	The information provided in this manuscript on Malkangiri goats was collected through a limited survey conducted in the year 2005.

2. Breed origin and development

Origin

The breed derives its name from the district Malkangiri in which it is found.

Wild or primitive breed - It is an indigenous breed of goats specific to this region and differs from goats found in the neighbouring districts both in physical confirmation and performance traits. First report on Malkangiri goats is that of Kornel (1996 & 2004).

Recent immigrations to the breed

No immigration has taken place in the recent past. However since the goats are given as gifts for various purposes in this region it cannot be altogether denied that there has been no immigration of other breeds found in the surrounding areas.

Population size and structure

The population size may exceed 50,000 as per the estimate of this study. About 80 to 90% of these goats are maintained in smallholder production system along with other species of animals like – cattle, sheep and poultry, all of whom form a component of integrated farming system involving crops and livestock. The family flock size varies widely from as low as 7 to as high as 150. When the goat population is small in the village they usually go for browsing along with cattle and sheep, but villages having large goat population rear the specie separately in flocks. When the number of goats are few they are mostly kept in the house of the owner in a separate space constructed raised wooden or bamboo floor specially for the goats. When the flock size is large the goats are raised in open spaces throughout the year like the Ganjam goats. The families raising goats mostly maintain females and very few males. All the males of one year and above are sold and young males are used for mating/breeding. No castration is practiced. Male to female ratio is maintained at 1:20.

Trend in number of females

(Increasing, stable or decreasing)

The demand for goat meat and other animal products is fairly high in this region. The goats are not only used for meat but also for the purpose of sacrifice and also given as gifts in several occasions as a result the number of female goats is on increase.

Risk status - The breed is not at risk

Artificial Insemination usage, Storage of semen and embryos

Natural mating is practiced as the technologies for A.I. and embryo transfer have not been perfected and in research stage.

3. Breed Description

The Malkangiri goats are taller and heavier than Black Bengal goats but shorter and lighter than Ganjam goats. The Malkangiri goats live in flocks. When flock size is small they are housed indoors in separate quarters by the owners, but when the size of the family flock is large several members of the village join together and raise the goats which helps them in reducing the cost of raising. The large flocks move from place to place in search of browsing material around the village. Most of the flocks are raised near the forest areas for easy availability of plants and trees for browsing. Kids are raised by the owners in their home. The kids are never separated from their mothers as such they go on suckling the mothers till next kidding. No additional feed is provided except browsing.

The traits measured on Malkangiri goats during the current survey included horn length, ear length, head length, chest circumference, paunch (abdomen) circumference, neck circumference, thigh circumference, height at withers, length of the body, length of the tail and body weight. The numbers of permanent teeth were also counted. The mean values for these traits for adult Malkangiri goats are presented in Table-5.

Coat colour

The predominant coat colour is brown although black, white and mixed colours of black, white and brown are noticed. In our study more than 70% of the goats were found to be brown, 25% black, 3% white and rest of mixed colours.

Ear & Head

Ears are erect, medium in size and extend horizontally and are rarely pendulous. Head is straight and medium in size.

Number and description of horns

The horns are found in both the sexes. They are straight, somewhat flat and directed backward and upward making an acute angle with the head.

The average length of horns in males and females measured during the survey is presented in table-5. The length and diameter of the horns seem to increase with age like other measurable traits, till four permanent teeth stage is reached.

Hair and wool type

The hairs are usually short. Long hairs are seen only in the neck and in the pubic region. Very few goats were seen to have wattles, which are very small in size. Beard was present only in 5% of goats. The goats are not shorn for hair production.

Body size and weight

Males are heavier than females. The average body weight was 30.2 kg. in adult bucks and 26.9 kg. in adult does in this study. Chest girth, paunch girth and height at withers are also higher for males than females.

Tail

Males have longer tails than females. In the samples measured the tail length was 13.4 cm. in males and 11.5 cm. in females.

Reproduction

Males mature early than females and are ready to serve even before one year of age. Therefore, the goat owners sell the male goats when they are about one year of age, retaining only a few for breeding of the goats in their flock. During this survey the male and female ratio of the goats in flocks varied from 1:5 to 1:20. The first heat in females is usually observed at about 6 to 7 months of age and the first kid is born when the does are about one year of age. The inter-kidding interval is about 6 months as such 2 kidding are recorded in a year. In 80% of the cases the does give birth to twins. Triplet births may be as high as 5%. Single kid is common in the first kidding.

The udder is round shape and medium in size so are the teats. The average daily milk yield is about 500 g. per goat and the lactation period is about 4 months. The owners however do not milk the goats since in most cases twins are born and the milk produced is adequate enough to maintain these two kids.

Table–5 : Mean values for the various traits measured in adult Malkangiri goats

Name of the Trait	Male		Female	
	Number of observations	Mean	Number of observations	Mean
Horn Length (cm)	39	14.6	84	12.1
Ear Length (cm)	39	11.4	84	13.5
Head Length (cm)	39	18.6	84	16.8
Chest Circumference (cm)	39	76.2	84	70.7
Paunch Circumference (cm)	39	90.8	84	83.7
Neck Circumference (cm)	39	40.0	84	35.3
Thigh Circumference (cm)	39	25.0	84	28.0
Height at withers (cm)	39	68.2	84	63.5
L1 (cm)	39	51.6	84	48.9
L2 (cm)	39	58.8	84	56.5
Tail Length (cm)	39	13.4	84	11.5
Body weight (kg.)	39	30.2	235	26.9

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

There are two breeding seasons. The first breeding season occurs during May and June and second breeding season during October and November. Since the goats are raised in forest or near the forest, availability of browsing material is not a problem. So the goat farmers do not find any difference in the growth of the kids born in both the breeding seasons.

The common diseases encountered in this breed include, PPR, (Peste des petes ruminants), Pneumonia, HS, menze of the skin, Contagious Ecthyma and Foot rot. Nutritional deficiency and Ecto Parasitic infections are also seen. The kid mortality is high and varies from 10 to 20% in different flocks studied during our investigation. Adult losses including predation and theft are about 20%. Lack of vaccination against PPR and other communicable diseases result in epidemics and cause heavy mortality. Vaccination is rarely practiced, so is the case for administration of anthelmintics for control of endo-parasites. The tribals use locally available materials for containing diseases. They have realized however that the system of medicine they practice is not adequate enough for control of infectious diseases, but effective control and eradication measures are still lacking due to their illiteracy and lack of awareness.

Genetic characteristic : Not available.

4. Breed uses and special qualities

Main uses

The goats of both the sexes are primarily used for production of meat (Chevon). Although goats give about 800 g. of milk per day, they are rarely milked since they give birth to twins and milk production is just adequate for raising of two kids. Goat droppings are good manure and are used for manuring the crop fields and backyard vegetable garden. The skin/hide has important economic value.

Special qualities

The tribal community inhabiting Malkangiri District since long has raised the Malkangiri goats. There was no administration of any vaccine or anthelmintics for control of diseases. Accessibility and lack of awareness has prevented. vaccination and treatment of endo and ecto-parasites in a scientific way. From this it can be concluded that these goats are fairly resistant to most of the goat diseases including parasitic diseases. They are also well adapted to high ambient temperature and heavy rains encountered in this region and survive and reproduce normally.

5. Management Conditions

Type of management

Most of the Malkangiri Goats are raised in smallholder system and meet their feed requirements through browsing. They are kept at home during the night in special sheds, which are usually made of locally available materials like – woods and bamboo. The kids are kept in village open spell throughout the day and suckle their mothers before they go for browsing and after they come back in the evening. The kids are also provided some food at home, which usually consists of fodder tree branches locally available, which are succulent and accepted by the kids. The flock size varies greatly from one village to another. When the number of goats are only few in a village they go along with the cattle and sheep for grazing purpose. However, when the number of goats are more they are taken separately and not along with the cattle. Since Malkangiri is a hilly district and 90 per cent of the total areas are forest land, predation from wild animals is a problem. Therefore, they need special care during browsing in the forest land and also when kept at home. Therefore, even if the houses are made of locally available materials they are made in such a manner, which prevents the entry of wild animals into the goat sheds. Sheds of raised floors are preferred for keeping goats as they protect from wetness and strong smell from urine.

During summer months goats are left to fend themselves, especially after 11 O'clock when families have collected the Mahua flowers from forest. They graze, eat mahua flowers and return home themselves.

The Malkangiri goats are of browsing type and they move from one place to another in search of browsing material within limited area not far from home. They drink water of streams/ponds/rivers depending upon the availability. The trees browsed upon vary from locality to locality. The common plants/ trees they browse include, *Mai, Kasi, Jui, Vaincha, Kanteikoli, Arakha, Gambhari, Panichia Lai, Gua Koli, Bara Koli, Sal,* tamarind and, Seema Kaian, Girli, Tendka, Dumri, Chilli, Ladan etc.

6. Performance trait information

Estimates of genetic distances from other breeds : Not studied during this investigation.

Analysis of genetic material : Not done in this investigation.

Description of conservation Programme in operation

Since the population size is fairly large no conservation programme has been undertaken so far.

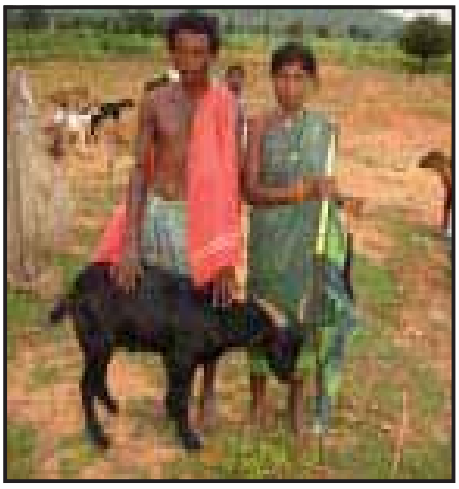
MALKANGIRI GOAT

Goat House, Malkangiri district

Malkangiri Goat Flock

Malkangiri Goat, doe

Malkangiri Buck with does



Malkangiri Goat Breeders

Malkangiri Goat Kids in the village

NARAYANPATNA

1. General Information

Species	-	Goats
Breed/breed variety	-	Breed
Geographical location		
Distribution	-	Found in Narayanpatna Block of Koraput district, Orissa, India.
Latitude	-	18°0′ – 18°75′ North
Longitude	-	82°0′ – 83°15′ East
Name, Local names and	-	Narayanpatna Goat
Information source	-	The information provided in this manuscript on Narayanpatna goats was collected through a survey conducted in the year 2005.

2. Breed origin and development

Origin

This breed of goat has been patronized primarily by Kondh tribe inhabiting in Narayanpatna region of Koraput district, Orissa since a long period. No information is available about the origin of the breed. Probably it has been developed by inter-breeding of crosses of goats of Orissa and neighbouring Andhra Pradesh over time. The breed has been selected both for large body size and high milk production since goat meat is in great demand by the tribes patronizing the breed as well as by other people living in the region and increased milk production is necessary for raising of kids especially when the kids born per kidding is large.

Wild or primitive breed

It is an indigenous breed developed locally by Kondh tribe of Narayanapatna.

Recent immigrations to the breed

No immigration has taken place in recent past as reported by the people in the same trait of the breed.

Population size and structure

The population of Narayanapatna goats is estimated to be more than 20,000. These goats are raised in smallholder production system. The family flock size varies greatly from as low as 5 to as high as 100. Males and females are maintained in ratio of 1:20. Males above one year of age are sold and young males are retained and used for breeding purpose. The bucks above 2 years of age are not used for breeding.

Trend in number of females (Increasing, stable or decreasing)

As per the practice all the female kids are saved to be raised as adults for breeding. Only those female goats which are old, sick or otherwise unsuitable for reproduction are culled. The number of female is on an increase due to increase in demand for goat milk and meat.

Risk status - Not at risk

Artificial Insemination usage, Storage of semen and embryos

Only natural mating is followed. Use of artificial insemination has not yet been reported so also the storage of semen and embryos of the breed.

3. Breed Description

The mean values for various traits measured on Narayanpatna goats for describing its breed characteristics are presented in Table-6.

Table–6: Mean values for the various traits measured in adult Narayanpatna goats

Name of the Trait	Male		Female	
	Number of observations	Mean	Number of observations	Mean
Horn Length (cm)	16	22.5	94	13.1
Ear Length (cm)	16	15.0	94	14.0
Head Length (cm)	16	18.5	94	17.1
Chest Circumference (cm)	16	88.0	94	73.4
Paunch Circumference (cm)	16	93.5	94	81.2
Neck Circumference (cm)	16	47.0	94	37.3
Thigh Circumference (cm)	16	41.0	94	31.6
Height at withers (cm)	16	77.0	94	70.0
L1 (cm)	16	56.5	94	52.3
L2 (cm)	16	64.5	94	60.0
Tail Length (cm)	16	15.5	94	13.7
Body weight (kg.)	16	38.0	188	28.0

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

Coat colour

The predominant coat colours are dull white and dull black and about 80% of the total goats are of these types. The coat colour of rest of the goats is either brown or mixed white and black.

Ear & Head

Ears are usually erect. Few specimen studied also had pendulous ears. Ear length increased with age and males had longer ears than females. In a sample of goats studied the average length of the ear was 14 cm for female goats and 15 cm for male goats. Head is slightly convex. Beard is absent. Wattles are seen in rare cases which are smaller in size than Ganjam goats. Head length also increases with age and males had longer heads than females. The mean length of the heads for adult female goats was found to be 17 cm and for male goats 18.5 cm.

Number and description of horns

Horns are present in both the sexes. The horns are small and straight extending either upward and backward or horizontally upward. Length of the horn increases with age of the goats. The males have longer horns than the females. Average length of the horns in adult female goats (goats with 4 to 8 teeth) was 13.1 cm and male goats 22.5 cm.

Hair type

The hairs on the surface of body are usually short and are not shorn. Tail hairs are longer than body hairs. The hairs on the thigh region are also long and dense.

Body size and weight

Narayanpatna goats are medium in size, usually bigger than Black Bengal but slightly smaller than Ganjam Goats. Legs are medium in length, straight and placed well apart from each other. Males are heavier than females. Body weight increases with age usually up to 4 teeth. The body weight of Narayanapatna goats according to dentition/age were found to be as follows.

Table : 6(A) : Mean values for body weight at various ages in Narayanapatna goats.

Age of the goats	Sex	Mean body weight	Range of body weight
One year or less	Male	18 Kg.	16-19 Kg.
	Female	19 Kg.	19-21 Kg.
Two permanent teeth	Male	22 Kg.	20.5 Kg.
	Female	20.0 Kg.	19-22 Kg.
Four to Eight teeth	Male	38 Kg.	37-39 Kg.
	Female	28 Kg.	24-36 Kg.

Tail

Tail is medium in size, thin and covered with long hairs. Some of the farmers clip the tail hairs after the birth of the kid to prevent matting and infection. Tail length increased with age marginally and is slightly longer in male goats compared to female goats. The mean tail length was 14 cm in adult female goats and 15.5 cm in adult male goats.

Reproduction

Males mature earlier than females. The young bucks are used for breeding purpose and all the bucks of above one year of age are disposed off. The castration is not practiced. However, the flock does not emit goatish smell since male and female goats are kept in ratio 1 to 20. Some owners do not keep any males and borrow male from neighbours for breeding purpose. This practice is followed almost throughout the district of Koraput and Nabarangpur.

The first heat in females is usually observed at about 6 to 7 months of age and the first kid is born when the does are one year of age. The inter-kidding period is 6 months and there are usually 3-kidding during a period of two years. Twin birth is very common and more than 80% of the goats give birth to twins and rest to triplets. Single birth is extremely rare and found only during goats kidding for first time.

Both udder and teats are medium in size. Some udders are funnel type with long fall teats. The average milk yield is about 600 to 700 g. per day per goat and lactation length is 5 months. The owners do not milk the goats since they give birth to twins or triplets and the milk produced is just sufficient enough to maintain these kids. Kids are not separated from their mothers. Therefore they go on suckling till next kidding. When the kids are about 3 months of age, some farmers milk the goats and provide some supplementary feed to the kids.

There are two breeding seasons. The first breeding season occurs during May and June and the second during October and November. Since the goats are raised near the forest, availability of browsing material is not limiting. Consequently the goat farmers do not find any difference in the growth of the kids born in either of the two breeding seasons.

The common diseases encountered in this breed of goats include, PPR, Pneumonia, Hemorrhagic Septicemia (HS), contagious ecthyma, enterotoxaemia, Foot rot, Blue Tongue?, Goat pox and FMD, and Ecto and Endo-parasites. The common endo-parasites are nematode worms like *H. contorts*, *T. ovis*, etc. The common trematodes are liver flukes and amphistomes. The kid mortality is high (about 20%). Adult mortality is also around 20% which includes deletion both from diseases as well as from predation and theft. Lack of vaccination against PPR and other contagious diseases usually result in epidemic and cause heavy mortality. Vaccination against these diseases is practiced at present but not regularly, since the goat keepers are illiterate and availability of vaccine at the time of need is a problem. Similar is the case for control and prevention of parasitic diseases. The Kondh tribals use the tribal medicines for treatment of diseases. Results realized however are far from satisfactory. Recently they have realized that the system of medicine they practice is not adequate enough for control of epidemics, but action is still lacking due to their illiteracy and lack of awareness.

Genetic Characteristic

No genetic studies have been reported so far on Narayanapatna goats.

4. Breed uses and special qualities

Main uses

It is a meat purpose breed, with good milk production. The average milk production per day is about 600 to 700 g. However, they are rarely milked by the goat farmers since the quantity of milk produced is adequate only for kids, since does of Narayanapatna give birth to twins and triplets. However, individual farmers milk goats when kids are about 3 months of age. The lactation period is 5 months. The kids are not weaned. Therefore, they go on suckling the mothers till the next kidding. These goats are primarily kept by the Kondh tribe and farmers of plains to meet their requirement at the time of festivals and for other cultural purposes, only when more number of goats are available they are sold in the market.

Skin and droppings are of agricultural value. The goat droppings form a good manure both for cereal crops and vegetables. Offals are also used as food by the weaker sections of the people.

Special qualities

The Kondh tribe inhabiting Narayanapatna block and plains have been raising these goats since long. They were not vaccinated or treated for any of the prevalent diseases till recent years. In spite of this the goat population of Narayanapatna breed has increased from year to year. This suggests that the goats of this breed are relatively resistant to the common goat diseases, which has helped them to survive and reproduce in the absence of any vaccination and other measures of disease control. These goats are well adapted to physical environment especially the high ambient temperature and high rainfall.

5. Management Conditions

Type of management

Narayanapatna goats are raised in smallholder production system and meet their feed requirements through browsing. Goats are kept at home during the night in special sheds which are usually made of locally available materials like – wood and bamboo. The kids are kept in home throughout the day and suckle their mothers before they go for browsing and after they come back in the evening. The kids are provided some food at home, which usually consist of branches of some trees which are succulent and accepted by the kids. The flock size varies greatly from one family to another as well as from one village to other. When the number of goats is only few in a village they go along with the cattle and sheep for grazing purpose. However, when the number of goats is large, they are taken separately and not along with other grazing animals. Since most of the goats are raised near the forest. Predation from wild animals is a problem. Therefore, they need special care during browsing in the forest land and also at home during night. Even if the houses are made of locally available materials they are made in such a manner, which prevents the entry of wild animals into the goat sheds. Raised floors are preferred for keeping goats since it reduces exposure to wetness and parasitic infestation.

The Narayanapatna goats are of browsing type. They move from one place to another in rotation for browsing within limited area not far from home. They drink water of streams/ponds/rivers depending upon its availability. The trees browsed upon vary from locality to locality and include *Mai, Kasi, Jui, Phering, Vaincha, Kanteikoli, Arakha, Gambhari, Panichia Lai, Gua Koli, Bara Koli*, *Sal*, *tamarind, Seema Kaian, Keli Kadam etc*.

6. Performance trait information

Estimates of genetic distances from other breeds : No information is available.

Analysis of genetic material : Not reported so far.

Description of conservation Programme in operation

Conservation programme does not exist.

NARAYANPATNA GOAT

Narayanapatna Goat, doe (Koraput district)

Narayanapatna Goat Breed Flock

Narayanapatna Goat, Buck

RAIGHAR GOAT

Raighar Goat

Raighar Goat, doe

Raighar Goat in forest

RAIGHAR

1. General Information

Species	-	Goats
Breed/breed variety	-	Breed
Geographical location		
Distribution	-	Widely distributed in villages in Raighar, Umerkot blocks and adjacent areas in Nabarangpur District, Orissa.
Latitude	-	17°0' – 19°15' North
Longitude	-	82°0' – 83°30' East
Name, Local names and	-	Raighar goats.
Information source	-	The information provided in this manuscript on Raighar goats was collected through a limited survey conducted in the year 2005.

2. Breed origin and development

Origin

The breed derives its name from Raighar of Nabarangpur district where it is mostly raised.

Wild or primitive breed - It is an indigenous breed of goats specific to this region and differs from goats found in the neighbouring areas. First report on Raighar goats is that of Kornel, (1996 & 2004).

Recent immigrations to the breed

As reported by the stakeholders no immigration to the flock has occurred in the recent past. However since the goats are given as gifts for various purposes in this region it can not be altogether denied that there has been no immigration from other breeds found in the surrounding areas.

Population size and structure

The population size may exceed 30,000 as observed during this study. These goats are mostly maintained in smallholder production system along with other species of animals like – cattle, sheep and poultry, all of whom form a component of integrated farming system involving crops and livestock. The flock size with the farmers raising these goats varies widely from very few to as large as 200. When the goat population is small in the village they usually go for browsing along with cattle and sheep. When the population is large, they are taken for browsing separately. The families raising goats mostly maintain females and very few males. All the males of one year and above are sold and young males are used for mating. No castration is practiced.

Trend in number of females

(Increasing, stable or decreasing)

The demand for goat meat is on an increase by the community raising these goats as well as by other people of the state. Therefore, the goat population

is increasing from year to year. Further the size of the population is fairly large and population of breeding females is therefore increasing from year to year.

Risk status - Not at risk

Artificial Insemination usage,

Storage of semen and embryos

Artificial Insemination is not practice. Natural mating is used for reproduction.

3. Breed Description

The traits measured on these goats during our survey included horn length, ear length, head length, chest circumference, paunch (abdomen) circumference, neck circumference, thigh circumference, height at withers, length of the body, length of the tail and body weight. The mean values for these traits for Raighar goats are presented in Table-7.

Coat colour

The predominant coat colour is solid brown. Sixty per cent of the goats of this breed were brown, the intensity of colour varying from individual to individual. 30% of the goats are black and other 10% mixed brown and black.

Ear & Head

Ears are erect and extend horizontally. Head is straight. Ear length varies from 12 to 15 cms. in the individuals measured in this study. Both beard and wattles are absent.

Number and description of horns

The males and females are horned. The length of the horns varies from as low as 5 cm. to as high as 17 cm. The details about the horn length also presented later in the following table.

Hair and wool type

The hairs are short. The hairs on the thighs are longer, so also on the tails and neck region.

Body size and weight

The Raighar goats are smaller than Ganjam goats, but bigger than Black Bengal goats in respect of height. They also weigh heavier than Black Bengal goats. Average body weight was 27.0 kg. for adult bucks and 25.5 kg. for adult does.

Tail

The average tail length is 12.0 cm. in males and 11.5 cm. in females.

Reproduction

Males mature early than females. The young bucks are used for breeding purpose and all the bucks of above one year of age are sold. Castration is not practiced. However, the flock does not have goatish smell since male goats are kept in ratio 1 to 20 females and are younger in age. Some owners do not keep any males and they borrow from neighbours for breeding purpose. This practice is followed almost throughout the districts of Koraput and Nabarangpur.

Table– 7 :Mean values for the various traits measured in adult Raighar goats

Name of the Trait	Male		Female	
	Number of observations	Mean	Number of observations	Mean
Horn Length (cm)	36	11.2	94	8.5
Ear Length (cm)	36	13.6	94	12.0
Head Length (cm)	36	17.9	94	14.5
Chest Circumference (cm)	36	70.3	94	63.0
Paunch Circumference (cm)	36	85.3	94	79.0
Neck Circumference (cm)	36	39.3	94	41.5
Thigh Circumference (cm)	36	29.4	94	24.0
Height at withers (cm)	36	65.6	94	59.0
L1 (cm)	36	48.7	94	33.5
L2 (cm)	36	58.9	94	42.5
Tail Length (cm)	36	12.0	94	11.5
Body weight (kg.)	36	27.0	220	25.5

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

The first heat in females is usually observed at about 6 to 7 months of age and the first kidding takes place when the does are about one year of age. The inter-kidding interval is about 6 months and there are 3 kidding during a period of two years. Twin birth is very common and more than 80% of the goats give birth to twins and in rest triplets. Single kidding is extremely rare and found only in first kidding. Both udder and teats are of medium size. The average milk yield is about 600 g. per goat per day and lactation length is around 5 months. The owners do not milk the goats since in most cases twins are born and the milk produced is adequate enough to maintain these two kids. The kids are allowed to suckle their mothers till the next kidding. Kids are not separated from their mothers. When the kids are about 3 months of age, some farmers milk the goats and alternatively provide some other feed to the kids.

There are two breeding seasons. The first breeding season occurs during April and May and second during October and November. Since the goats are raised in the forest or near the forest, availability of browsing material is not a problem. The goat farmers do not find any difference in the growth of the kids born in the two breeding seasons.

The goats are not sheared for hair.

The common diseases encountered in Raighar goats include PPR, (Peste des petes ruminants), Pneumonia, Contagious Ecthyma, Foot Rot and Goat pox. They also suffer from endo and ecto-parasites. The kid mortality is high and is about 20%. Adult mortality is also high about 20%. This includes mortality both from diseases as well as predation and theft. Lack of vaccination against PPR and other communicable diseases usually result in heavy mortality. Vaccination is practiced at present but not regularly, since the goat keepers are illiterate with low awareness and availability of vaccine at the time of need is a problem. Similar is the case for control and prevention of parasitic diseases. The tribals use the local herbal medicines for containing diseases. Recently they have realized that the system of medicine they practice is not

adequate enough for control of infectious diseases, but action is still lacking due to their literacy and awareness to access livestock health services.

Genetic characteristic : Not studied

4. Breed uses and special qualities

Main uses

The goat of both the sexes are primarily used for meat (chevon) production. Although female goats give about 600 gm. of milk per day, they are rarely milked since they give birth to twins or triplets and milk production is just adequate for raising of two/three kids. Goat fecal material is a good manure and used for manuring the crop fields and vegetable gardens. The skin also fetches a good price.

Special qualities

The tribal community inhabiting Nabarangpur district has raised the Raighar goats since long. The Raighar goats are not vaccinated or treated for any of the diseases till recent years. In spite of this the goat population of Raighar breed increased over the years. This suggests that the goats of this breed are relatively resistant to the most common goat diseases, which has helped them to survive and reproduce in the absence of prophylactic and curative health control measures. They are well adapted to their native environment.

5. Management Conditions

Type of management

Most of the Raighar goats are raised in small holder system and meet their feed requirements by browsing. They are kept at home during the night in the special sheds which are usually made of locally available woods. The kids are kept at home throughout the day and suckle their mothers before they go for browsing and after they come back in the evening. The kids are provided some feed at home which usually consist of leaves of some trees which are succulent and accepted by the kids. The family flock size varies greatly from one village to another. When the numbers of goats are only few in a village they go along with the cattle and sheep for grazing purpose. When the number of goats is large they are taken separately for grazing. Since most of the goats are raised near the forest predation from wild animals is a problem. Therefore, they need special care during browsing in the forest land and also at home. Even if the houses are made of locally available materials they are made in such a manner, which prevent the entry of wild animals into the goat sheds. Sheds on raised floors are preferred for keeping goats as these avoid wetness and strong ammonia smell.

Goats move from one place to another in rotation for browsing within limited area not far from home. They drink water of streams/ponds/rivers depending upon the availability. The trees browsed upon vary from locality to locality and include Gambhari, Tamarind, Seema Kaian, Girli, Mamagua, Tendka, Ladan, Chelidantri, Dumuri, Chilli, Mutrimal, Khatakoli etc.

6. Performance trait information

Estimates of genetic distances from other breeds

No information available.

Analysis of genetic material

Not reported so far.

Description of conservation Programme in operation

Conservation programme does not exist.

SHEEP BREEDS

BOLANGIR

1. General Information

Species	-	Sheep
Breed/breed variety	-	Breed
Geographical location		
Distribution	-	They are mostly found in Kalahandi, Bolangir, Bargarh, Sambalpur, Sonepur boarder blocks of Boudh and Sundergarh districts of Orissa.
Latitude	-	20° - 22° North
Longitude	-	84° - 87° East
Name, Local names and	-	Bolangir sheep.
Information source	-	The information provided in this manuscript on Bolangir sheep was collected through a limited survey conducted in the year 2005-06.

2. Breed origin and development

Origin

This breed of sheep is patronized by Other Backward Communities (OBC) including Gouda community of Orissa inhabiting in the districts of Western Orissa.

Wild or primitive breed

It is an established breed of sheep recognized both by FAO and ICAR.

Recent immigrations to the breed

No immigration to the breed has been reported in the recent past.

Population size and structure

The population of Bolangir sheep is fairly large possibly exceeding 50,000. It is raised in smallholder production system as a part of the integrated farming system involving crop and livestock. The family flock size varies greatly from as low as 10 to as high as 50. The sheep flock is maintained by each family consist of rams, ewes, and lambs. The breeding male to female ratio is usually maintained at 1:10 to 1:20. The sheep go along with cattle and goats of the village for grazing and come back in the evening. Some farmers prefer to raise their sheep themselves or by use of hired labour separately from other species of domestic animals. Males are given more care since they are used for 'ram fighting' sport purpose in addition to breeding.

Trend in number of females

(Increasing, stable or decreasing)

Most of the people of Orissa are non-vegetarian and demand for animal proteins like mutton, chevon, poultry meat and egg etc. is high. There is demand for mutton since it is accepted by all sections of society. Therefore, the number of breeding females of Bolangir sheep is increasing over the years and will not be less than 20,000 at present.

Risk status - Not at risk

Artificial Insemination usage,

Storage of semen and embryos - Not practiced so far.

3. Breed Description

Coat colour

The predominant coat colour is dull golden brown and 85 to 90% of the sheep have this coat colour. 5 to 10% of the sheep are dark brown in colour, 1 to 2% are black and rest of mixed colours.

Ear & Head

Ears vary considerably among the individuals based on ear type and length. Three varieties are recognized based on ear type. In some of the individual ears are very small and stumpy and look like appendages. The long ears are pendulous and small ears are horizontal. Head is straight. Beard and wattles are absent. Neck is medium in length. Colour of the face is same as the coat colour of the body.

Number and description of horns

The males are horned. The horn is long and curved in adults and females are polled. The horns in the males usually extend outward, downward and upward.

Hair and wool type

The body is covered with rough, coarse and hairy type wool measuring from 5 to 6 cm. in length and dull golden yellow in colour. The rams have long hairy fleece in the ventral side of the neck and near the thigh region of the leg. Legs, and belly are devoid of wool.

Body size and weight

The Bolangir sheep is a small to medium body sheep mostly used for production of mutton. Circumference of the chest, paunch girth circumference of the neck and thighs, height at withers, the distances between point of wither and hip joint, and distance between hip joint and shoulder were measured to describe body size. The mean values for these traits for the adult rams and ewes are presented in the Table-8 along with mean values for horn, ear, and head. It will be worthwhile to mention here that measurements for these traits increase with age almost upto two incisor teeth stage.

Table-8 Mean values for various traits measured in adult Bolangir sheep

Name of the Trait	Male		Female	
	Number of observations	Mean	Number of observations	Mean
Horn Length (cm)	20	14.0	60	Polled
Ear Length (cm)	20	8.0	60	8.7
Head Length (cm)	20	14.0	60	14.7
Chest Circumference (cm)	20	77.0	60	73.0
Paunch Circumference (cm)	20	82.0	60	74.0
Neck Circumference (cm)	20	39.0	60	34.5
Thigh Circumference (cm)	20	30.0	60	29.5
Height at withers (cm)	20	62.0	60	57.5
L1 (cm)	20	54.0	60	53.5
L2 (cm)	20	63.0	60	61.5
Tail Length (cm)	20	10.0	60	11.5
Body weight (kg.)	20	26.1	255	23.1

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

Besides the above the body weight was also recorded. Like all other traits body weight increased with age. The average adult body weight on the sample measured was 23.1 kg. for female and 26 kg. for male. The body weight in males was 15.0 kg. at 6 months of age, 19.0 kg. at 1 year of age and 20 kg. at two-teeth stage.

The udder size in ewes varied from small to medium in different ewes examined.

Tail

Tail is thin, medium in size and varies from 10 to 12cm. in length in the samples measured.

Reproduction

In Bolangir sheep first lambing occurs at 20 to 24 months of age and inter-lambing interval varies from 9 to 12 months. Ninety five per cent of the ewes give birth to singles and only 5 per cent to twins. According to the farmers no triplet births has been observed so far. The farmers do not milk the sheep but the milk production is adequate enough to maintain one lamb. There are wide differences in performance traits between the sheep depending upon the location. Those who are raised on vegetated area perform better in growth and reproduction and also have better survival. There are two main breeding seasons, one during the month of Asadha and Srabana (July and August) and other during Magha & Phalguna (February & March).

The males are selected based on their physical conformation which essentially reflects size/weight and general health. However, since fighting among rams is very popular in this part of the state winning rams are given preference to reproduce the next generation. Usually no-selection is practiced in females. Only those ewes of reproductive age, which are sick and otherwise unsuitable for reproduction, are culled. Mating among rams and ewes are regulated. The breeding male to female ratio in the flock varies from 1:10 to 1:20. There is no exchange of males between the farmers. Males of 1½ to 3 years of age are given preference for breeding.

The males, which are not required for breeding are castrated and sold about one year of age.

Genetic Characteristic

No studies have been conducted so far.

4. Breed uses and special qualities

Main uses

The Bolangir sheep are primarily used for production of mutton. The other product of economic value is their skin, which is used for a variety of purpose. The wool is hairy and of poor quality. The sheep are not sheared. The sheep manure is used for fertilizing the crops and vegetable fields.

The Bolangir sheep are used for various socio-cultural purposes besides gift and sacrifice.

Special qualities

Bolangir sheep have been raised by OBC and Gouda community of Orissa since long without any vaccination and administration of medicines for control of diseases. Vaccination against important sheep diseases and use of anthelmintics against internal parasites is a recent phenomenon. In spite of this, the population of the breed has grown over the years suggesting these sheep are relatively resistant to most of the diseases. They are well adapted

to the prevalent high ambient temperature and other climatic conditions of their habitat which are stressful and continue to survive and reproduce. The breed is known to withstand draught of Western Orissa.

5. Management Conditions

Type of management

Bolangir sheep are mostly raised in smallholder production system. The family flock size varies considerably from as low as 10 to as high as 50. Shelter is provided when the sheep are at home. The houses are *kuchha* type made of wood, bamboo with thatched roof. Many of the sheep sheds did not have protection from predators. Several families join together to have a shepherd for grazing of their sheep. Usually, one shepherd is employed for grazing 200 to 300 sheep. Every sheep farmer contributes to the wages in proportion to the number of sheep he has. The sheep owners are usually farmers. However, the sheep move from place to place within a limited area for purpose of grazing and are brought back to the village in the evening. The lambs are raised at home till three months of age and suckle their mothers before they are taken over for grazing. The sheep flock usually consists of a large number of ewes, a few breeding rams and resultant lambs. The sheep are examined for physical condition and any ailment or abnormal behaviour both in morning as well as evening.

Predation is a minor problem in some places. Mosquito bite is a major problem and causes annoyance, which affect sleep and consequently performance.

Bolangir sheep live mostly on grazing and supplementary feed at home is of minor consequence. Minerals or other feed additives are also given by few farmers.

The most common diseases encountered are Foot rot, PPR, and Contagious Ecthyma. Endo-parasitic infestations are also a problem. The sheep are vaccinated regularly at present against PPR as well as drenched with broad-spectrum anthelmintics for control of parasitic infestation. They take the help of veterinarians for control of diseases where they feel they lack understanding of the situation.

The lamb mortality varies from 10 to 15%. The common causes for lamb mortality are morbidity due to diarrhea, pneumonia and poor milk availability for lamb and predation. The loss of adult animals amounts to 10% due to diseases, predation and theft.

6. Performance trait information

Estimates of genetic distances from other breeds

No information is available.

Analysis of genetic material

Not available.

Description of conservation Programme in operation

The population of Bolangir sheep is fairly large at present. No conservation and genetic improvement programme are in operation.

BOLANGIR SHEEP

Bolangir Ram

Bolangir Ram

Bolangir Eue

CHHOTNAGPURI SHEEP

Chhotnagpuri ewe, Keonjhar

Chhotnagpuri ewe, Mayurbhanj

CHHOTTANAGPURI

1. General Information

Species	-	Sheep
Breed/breed variety	-	Breed
Geographical location		
Distribution	-	They are mostly found in Mayurbhhanj and Keonjhar districts of Orissa.
Latitude	-	21° - 22°50' North
Longitude	-	85° - 87° East
Name, Local names and	-	Chhottanagapuri sheep.
Information source	-	It is an approved breed by FAO & ICAR. The information provided in this manuscript on Chhottanagapuri sheep was collected through a limited field survey conducted in the year 2005.

2. Breed origin and development

Origin

This breed of sheep is patronized by Scheduled Castes, Scheduled Tribes and Other Backward Communities (OBC) including Gouda community of Orissa inhabiting in the districts of Mayurbhanj and Keonjhar. The breed tract is extended from Jharkhanda State.

Wild or primitive breed

It is an established breed of sheep recognized both by FAO and ICAR.

Recent immigrations to the breed

No information is available.

Population size and structure

The population of Chhottanagapuri sheep is fairly large around 50,000 in the two districts of Orissa. It is raised in smallholder production system as a part of the integrated farming system involving crop and livestock. The family flock size varies greatly from as low as 8 to 10 to as high as 80. The sheep flock maintained by each family consists of rams, ewes, and lambs. The breeding male to female ratio is usually maintained between 1:10 to 1:20. The sheep go along with the cattle and goats of the village for grazing in the morning and come back to homestead in the evening. Some farmers prefer to raise their sheep by themselves or by use of hired labour. When labour is employed, several families join together to reduce the cost of production.

Trend in number of females

(Increasing, stable or decreasing)

Most of the people of Orissa are non-vegetarian and demand for animal proteins like mutton, Chevon, poultry meat and egg etc. is high. There is demand for mutton. The number of breeding females, therefore, of Chhottanagapuri sheep is increasing over the years and will not be less than 30,000 at present.

Risk status - Not at risk

Artificial Insemination usage,

Storage of semen and embryos

Not practiced so far.

3. Breed Description

The mean values for different traits measured on Chhotnagpuri sheep for describing its breed characteristics are presented in Table-9.

Coat colour

The coat colour varies from light gray to brown to dark brown and more than 80% of the sheep have this coat colour. Few sheep of black and other mixed colours were also observed during our study. They are in demand for various socio-religious demands.

Ear & Head

Ears are very small to medium in size, extend horizontally and are rarely drooping. Forehead is lighter in colour compared to the body colour. Head is medium in size. The mean values for ear and head length are presented in the Table-9. Wattles and beards are absent.

Number and description of horns

Both the sexes are polled.

Hair and wool type

Fleece is coarse and hairy, measures about 5 to 6 cm. in length. Legs and face are devoid of wool. The animals are clipped/sheared only once in the year.

Body size and weight

The Chhottanagapuri sheep is small, light bodied with thin legs and usually used for production of mutton. Chest girth, paunch girth, circumference of the neck and thighs, height at withers, the distances between point of wither and hip joint (pin bone), and distance between hip joint and shoulder joint were measured in this study to describe body size. The mean values for these traits for the adult rams and ewes of Chhottanagapuri sheep are presented in the Table-9. Each of these traits were seen to be influenced by age and sex. Males had bigger chest, thicker neck, thicker thighs, and were taller than the females. All these traits also increased with age upto 2-teeth stage.

The udder is small in size so are also the teats.

Tail

Tail is thin and short. The mean tail length for male and female adults on the individual measured is presented in the Table-9.

Table-9 Mean values for various traits measured in adult Chhottnagpuri sheep

Name of the Trait	Male		Female	
	Number of observations	Mean	Number of observations	Mean
Horn Length (cm)	20	14.0	60	Polled
Ear Length (cm)	20	8.0	60	8.7
Head Length (cm)	20	14.0	60	14.7
Chest Circumference (cm)	20	77.0	60	73.0
Paunch Circumference (cm)	20	82.0	60	74.0
Neck Circumference (cm)	20	39.0	60	34.5
Thigh Circumference (cm)	20	30.0	60	29.5
Height at withers (cm)	20	62.0	60	57.5
L1 (cm)	20	54.0	60	53.5
L2 (cm)	20	63.0	60	61.5
Tail Length (cm)	20	10.0	60	11.5
Body weight (kg.)	20	26.1	255	23.1

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

Reproduction

In Chhottanagapuri sheep, first estrous occurs at about 6 to 8 month of age and first lambing at 12 to 15 months of age. There are two lambing in a period of a year. Twining is extremely rare. More than 90 per cent of the ewes give birth to singles. The milk production is adequate enough to maintain one lamb. There are wide differences in performance traits of the sheep depending upon location. Those who are raised in area with adequate grazing/ browsing material perform better in all respects. There are two main breeding seasons, one during July and August and other during February & March.

The males are selected based on their physical appearance, reflecting vigour and live weight. All the available ewes are used for breeding. Mating is random. Breeding male to female ratio in the flock varies from 1:10 to 1:20. There is no exchange of males between the farmers. Young males are preferred for breeding.

The males, which are not required for breeding are castrated and sold mostly to meet household expenses.

Genetic Characteristic

No studies have been conducted so far.

4. Breed uses and special qualities

Main uses

The Chhottanagapuri sheep is mostly used for production of mutton. The other products of economic value is their skin, which is used for a variety of purposes. The wool is carpet quality. The sheep manure is of value for fertilizing

the crop and vegetable fields.

The Chhottanagapuri sheep are used for various socio-cultural purposes besides gift and sacrifices by local tribes.

Special qualities

Chhottanagapuri sheep have been raised by SC, ST and OBC communities of Orissa since long without any vaccination and administration of medicines for control of diseases. Vaccination against important sheep diseases and use of anthelmintics against internal parasites is a recent phenomenon. It has been reported that Chhottanagapuri breed of sheep is well adapted to its environment and fairly resistant to most of the common sheep diseases. The breed can be improved to produce more carpet quality wool and meat.

5. Management Conditions

Type of management

Chhottanagapuri sheep are raised in smallholder production system. The family flock size varies considerably, from as low as 8 to as high as 80. Shelter is provided when the sheep are at home. The houses are *kuchha* type made of wood, bamboo with thatched roof. Sheep are sent for grazing along with cattle and goats. Several families also join together for appointment of a shepherd for grazing of the sheep. Usually, one shepherd is employed for every 100 to 150 sheep. Every sheep farmer contributes to the wages in proportion to the number of sheep he sends for grazing. The sheep owners are usually farmers. However, the sheep graze in fields close to village and are brought back to the village in the evening. The lambs are raised at home till two months of age and suckle their mothers before they are taken out for grazing and after they come back. The sheep flock usually consists of a large number of ewes, few breeding males and lambs. The sheep are supervised for physical condition and other purposes both in morning as well as evening.

Predation is a problem depending upon location of the village. Mosquito bite is also a major problem.

Chhottanagapuri sheep live mostly on grazing. Minerals or other feed supplements are given by some well to do farmers.

The most common diseases encountered are Sheep pox, Foot rot, PPR and Contagious Ecthyma etc. besides various types of parasitic infestations. The sheep are vaccinated regularly at present against PPR as well as drenched anthelmintics for control of diseases and parasitic infestations.

The stunted growth of lamb and mortality varies from 10 to 15 per cent. The common causes of lamb mortality are poor growth due to inadequate milk from ewes enteritis, pneumonia and predation. The adult mortality amounts to 10% due to diseases, predation and theft.

6. Performance trait information

Estimates of genetic distances from other breeds

No information is available.

Analysis of genetic material

Not available.

Description of conservation Programme in operation

The population of Chhottanagapuri sheep is fairly large at present. Conservation and genetic improvement through selection of breeding rams on institutional farms and involving larger flocks of farms may be undertaken. The breed can be improved for mutton and quality carpet wool.

DALUA

1. General Information

Species	-	Sheep
Breed/breed variety	-	Breed
Geographical location		
Distribution	-	Found in the Chilika coast in Rambha & Khallikote Blocks of Ganjam district of Orissa.
Latitude	-	
Longitude	-	
Name, Local names and	-	Dalua sheep. The local name is Dalua since this breed of sheep feeds on twigs and plants found on the coast of Chilika lake. Some authors named the breed Red Ganjam also.
Information source	-	The information provided in this manuscript on Dalua sheep was collected through a limited survey conducted in the year 2005.

2. Breed origin and development

Origin

This breed of sheep is patronized primarily by Golla community inhabiting the Chilika coast of Rambha & Khallikote Blocks of Ganjam District of Orissa since a long time. No definite information is available about the origin of these sheep.

Wild or primitive breed

It is an indigenous breed of sheep.

Recent immigrations to the breed

Golla community wants to maintain the purity of their animals and they do not like any mixing with other breed or use breeding of other breeds those readily available. Hence there has been no immigration to the breed in recent years.

Population size and structure

The population of Dalua sheep inhabiting Chilika coast is estimated to be around 15,000. They are raised in smallholder production system. The family flock size varies considerably from as low 10 to as high as 100 sheep. Several families join together and raise the sheep as a single flock to reduce the cost of this rearing. The goat and sheep are raised together in one flock. The flocks are semi-nomadic in nature and move from place to place in search of grazing/browsing within a limited distance from the residence of the owners. Throughout the year sheep live in open space and are not provided any shelter to protect them from rain or sun. Most of the flocks usually graze/browse in the nearby forest. Like Dalua goats they also sit on the crop and vegetable fields to improve the fertility of the soil. Sitting of 100 sheep earns revenue of Rs.30/- per night for the owner. Sheep and goats sit together and not separately since they are raised in one flock. The families, having goat and sheep pay about Rs.1000/- per month for 300 sheep and goats to the shepherd and the number of shepherd per flock varies depending upon the flock size. Usually one shepherd is employed for every 300 goats and sheep.

Flock of sheep of individual family comprises of rams, ewes and lambs. The ratio of males to females varies from 1:50 to 1:60. Surplus males are disposed of at about one year of age. The disposed males are not castrated.

Trend in number of females

(Increasing, stable or decreasing)

The demand for animal products like meat, milk and egg is on an increase from year to year. Since mutton is delicious and acceptable to all sections of society the sheep population is increasing from year to year. As a result the number of breeding females is on an increase and expected to be not less than 20,000.

Risk status - Not at risk

Artificial Insemination usage,

Storage of semen and embryos - Not practiced so far.

3. Breed Description

The traits measured on the Dalua sheep during the survey reported in this study included horn length, ear length, head length, chest girth, paunch girth, neck circumference, thigh circumference, height at withers, body length, tail length and body weight. The numbers of permanent teeth were also counted. The mean values for these traits have been presented in Table-10.

Coat colour

The predominant coat colour is lustrous golden-red. More than 90% of Dalua sheep have this coat colour. Rest 10% have other coat colours like deep brown or a mixture of brown and red.

Ear & Head

Ears are medium in size and slightly dropping in nature, forehead is slightly convex and is of same colour as that of body. Ear and head length according to sex have been presented separately below in Table-9. Beard is absent. Few animals have wattles.

Number and description of horns

The females are polled whereas the males have horns. The horns are flat, ridged spiral, pointed at the tip and extended backward & upward and are twisted. The horn length in males varied from 30 cm. to 36 cm.

Hair and wool type

This is a heavy sheep with short tail. The body coat is hairy. The hairs are usually small, lustrous and golden-red in colour. The rams have long hairs in the ventral side of the neck and near the thigh region of the leg. Tail hairs are slightly longer than body hairs.

Table-10 Mean values for various traits measured in adult Dalua sheep

Name of the Trait	Male		Female	
	Number of observations	Mean	Number of observations	Mean
Horn Length (cm)	18	34.0	50	Polled
Ear Length (cm)	18	14.5	50	13.0
Head Length (cm)	18	24.0	50	23.2
Chest Circumference (cm)	18	83.5	50	78.8
Paunch Circumference (cm)	18	88.5	50	81.4
Neck Circumference (cm)	18	57.0	50	40.2
Thigh Circumference (cm)	18	45.0	50	43.6
Height at withers (cm)	18	68.0	50	66.2
L1 (cm)	18	56.5	50	56.2
L2 (cm)	18	61.0	50	60.5
Tail Length (cm)	18	6.0	50	7.2
Body weight (kg.)	18	35.6	192	29.8

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

Adult size and weight

Dalua sheep are medium in size and compact in body conformation. Males are heavier than females. The weight of adult ewes ranged from 25 to 33 Kg., in adult rams from 29 kg. to 43 kg. The average adult body weight was 31 Kg. in females and 35.6 Kg. in males. The legs are medium in size and placed well apart from each other. The chest circumference, abdomen circumference, neck circumference and thigh circumference were higher for males compared to females. In the sheep measured during this investigation chest circumference varied from 76 to 82 cm. in females and 86 to 91 cm. in males. Similarly, abdomen (paunch circumference) ranged from 76 to 93 cm in females and from 88 to 90 cm. in males. The neck circumference varied from 38 to 44 cm in females and 55 to 59 cm in males; thigh circumference varied from 38 to 46 cm in females and 44 to 46 cm in males. The mean values for chest circumference, paunch circumference, neck circumference and thigh circumference respectively 83.5 cm., 88.5 cm., 57.0 cm. and 45.0 cm. in males and 78.8 cm., 81.4 cm., 40.2 cm. and 43.6 cm. in females. Rams were taller than ewes. The height at withers ranged from 65 to 68 cm in ewes and 67 to 69 cm in rams. Height at croup was also higher for rams then ewes.

The udder size in ewes varied from small to medium. There are two teats, which are small in size.

Tail

Tail is short and thin. The average tail length was 6.0 cm. for males and 7.2 cm. for females.

Reproduction

Both rams and ewes mature around one year of age. The first lambing takes place usually at 1.5 year of age. More than 60% of ewes give birth to singles and the rest to twins. Inter-lambing period is 270 days. Oestrus length ranges from 24 to 36 hours. Although the ewes reproduce throughout the year there are two principal breeding seasons, one during March and April and the other between October and November. The laming percentage is 90% of the number of ewes of reproductive age.

The males are selected based on their physical appearance like horn type, reflecting live weight and vigour. No selection is practiced in females. Only ewes beyond reproductive age, are culled. The male to female ratio in the flocks studied varies from 1:50 to 1:60. The Golla community, patronizing the Dalua sheep, prefers to use their own males for mating with the females. During recent years some flock owners are practicing exchange of rams once in two to three years for a limited period to reduce in breeding. The rams may be used for 5 to 6 years depending upon their physical condition and ability to serve.

As stated above all the females are selected to reproduce next generation except those, which are sick, old or otherwise unfit to reproduce. The males, which are not required for breeding are sold around one year of age but are not castrated. The average milk yield is about 300 g. per day and lactation length is about 90 days.

Genetic Characteristic

No studies have been conducted so far.

4. Breed uses and special qualities

Main uses

The Dalua sheep are primarily used for production of mutton. They are not milked as the milk yield is just adequate for the lambs. Due to limited milk production, most of the owners do not like twins. The other product of economic value is skin,

which is used for a variety of purposes. The hairs are small. The sheep manure is claimed to have higher value for fertilizing the crop and vegetable fields. Dalua sheep are penned on stables from December to May.

The Dalua sheep are of special significance to the Golla community who live on small ruminant husbandry as they are used in various socio-cultural purposes e.g. given as gift or used as sacrificial animal.

Special qualities

Dalua sheep have been raised by the Golla community since long without any vaccination and administration of medicines for control of diseases. Vaccination against important sheep diseases and use of anthelmintics against internal parasites is a recent phenomenon. Inspite of this, the sheep population has survived over the years suggesting that these sheep are relatively resistant to most of the sheep diseases. They are well adapted to high ambient temperature with high humidity and heavy rainfall conditions.

5. Management Conditions

Type of management

Dalua sheep are mostly raised in smallholder production system. The family flock size varies considerably from as low as 10 to 20 to as high as 100. These sheep are raised in the open along with goats but nearer to the house unlike Ganjam sheep, which are maintained away from home throughout the year. Shelter is provided during night and adverse weather condition by some families. As reported the shepherd earns Rs.1000/- per month for every 300 animals taken for grazing. Every sheep farmer contributes to the wages proportionate to the number of sheep he sends for grazing. The sheep owners are usually crop farmers. However, the sheep are raised along with the goats and move from place to place within a limited area for purpose of grazing and are brought back to the village in the evening. The lambs are raised at home till three months of age and suckle their mothers before they are taken for grazing and after they come back. The sheep flock usually consists of large number of ewes, a few breeding males and lambs from three months to one year of age. Goats are usually watered from ponds/ rivers/ streams available in the grazing area. No additional water is provided at home.

Predation from wild animals is a problem in many places in grazing areas especially the forests.

Dalua sheep live mostly on grazing and not supplemented with any feed and minerals. Salt is provided once in a month *ad lib*. The favoured plant and shrubs taken by Dalua sheep include *Seema Kainya, Neem, Aswatha, Bhaincha Koli, Kantei Koli, Babul* etc.

The most common diseases encountered in these sheep are Foot rot, PPR and Bluetongue (?) Indigenous medicine was practiced in the past for control of diseases. However, now the sheep are regularly vaccinated against PPR and also given anthelmintics for control of gastro-intestinal parasites.

The lamb mortality is about 20%. The adult mortality also amounts to 20% due to diseases, predation and theft.

6. Performance trait information

Estimates of genetic distances from other breeds

No information available.

Analysis of genetic material

Not available.

Description evaluation conservation and improvement Programme in operation

The population of Dalua goats is fairly large at present and is increasing from year to year.

DALUA SHEEP

Horn of Dalua Ram with long horns

Dalua Sheep Flock

Dalua ewe and Lamb

Dalua Ram

Dalua Sheep, ewe

Dalua ewe, Rear View

EDKA

1. General Information

Species	-	Sheep
Breed/breed variety	-	Breed
Geographical location		
Distribution	-	They are mostly found around Chilika lake in Khurda and Puri districts of Orissa.
Latitude	-	19° - 20° North
Longitude	-	85° - 86° East
Name, Local names and	-	Edka sheep. Synm. Erka.
Information source	-	The information provided in this manuscript on Edka sheep was collected through a limited survey conducted in the year 2005-06.

2. Breed origin and development

Origin

This breed of sheep is patronized by Yadava (Gouda) community inhabiting in the Chilika coast of Khurda and Puri district.

Wild or primitive breed

It is an indigenous breed of sheep, first discovered in 1996 and reported by Kornel (2004).

Recent immigrations to the breed

Edka sheep farmers hold their sheep in high esteem and do not like the breed to be diluted with genetic characteristics of other breeds (descend or non-descended populations). Therefore, no immigrations have taken place in the recent past.

Population size and structure

The population of Edka sheep is fairly large (around 20,000). It is mostly raised in smallholder production system. The family flock size varies greatly from as low as 20 to as high as 200. When the number of sheep per family is fairly large few farmers join together and mostly raise the sheep separately. Both rams and ewes are maintained by each family and ratio of breeding male to females is around 1:30. But the sheep population move from place to place in search of grazing material but they return to the village in the evening. The sheep are maintained in the open when the flock size is large. In some villages, the sheep flocks are temporarily moved away from Chilika area during rainy season.

Trend in number of females

(Increasing, stable or decreasing)

Most of the people in Orissa are non-vegetarian and demand for mutton, chevon, fresh poultry meat and egg etc. is high. There is demand for mutton but less than chevon. Therefore, the number of breeding females of Edka sheep is increasing over the years and will not be less than 8,000 to 10,000 at present.

Risk status - Not at risk

Artificial Insemination usage,

Storage of semen and embryos

Not practiced so far.

3. Breed Description

The mean values for various traits measured on adult Edka sheep for describing its breed characteristics are presented in Table-11.

Coat colour

The coat colour of Edka sheep varies from light to dark brown with some white patches on the body of some animals.

Ear & Head

Ears extend horizontally from head, mostly straight, sometimes slightly pendulous. Head is straight slightly convex in the middle. Neck is medium in length. Colour of the face is same as the coat colour of the body. Beard is absent. Few animals have wattles. The ear length varies from 11 to 15 cm. and head length from 14 to 20 cm. in the samples measured during the course of the investigation.

Number and description of horns

The males have horns usually extending backward and downward. Females are polled.

Hair and wool type

The body fleece is usually hairy, small in quantity, lustrous and light to dark brown in colour. Once a year moulting takes place. Many sheep are heavy too. The rams have long hairs in the ventral side of the neck and near the thigh region of the leg. Tail hairs are slightly longer than body hairs.

Body size and weight

Edka is medium in size and body weight. Kornel (2004) reported body weight ranging from 12 to 18 kg. in females and 18 to 25 kg. in males of one year of age of Edka sheep. In this study chest circumference, paunch circumference, neck circumference, thigh circumference and height at withers, length of body from withers to hip joint (L1) and the distance between hip joint to shoulder joint (L2) were measured to describe body size. The mean values for all the above traits increased with age and there were also differences between the sexes.

Tail

Tail is short in length and varied from 6 to 9 cm.

Table-11 Mean values for various traits measured in adult Edka sheep

Name of the Trait	Male		Female	
	Number of observations	Mean	Number of observations	Mean
Horn Length (cm)	20	21.5	65	Polled
Ear Length (cm)	20	15.0	65	13.5
Head Length (cm)	20	18.0	65	17.5
Chest Circumference (cm)	20	70.0	65	63.5
Paunch Circumference (cm)	20	85.0	65	81.0
Neck Circumference (cm)	20	37.5	65	36.2
Thigh Circumference (cm)	20	32.0	65	28.0
Height at withers (cm)	20	71.0	65	67.0
L1 (cm)	20	53.0	65	50.0
L2 (cm)	20	61.0	65	57.0
Tail Length (cm)	20	8.5	65	8.2
Body weight (kg.)	20	27.0	205	24.5

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

The body weight increased with age and there were significant differences between males and females for body weight at all ages. In the samples measured. Bodyweight for one year old male was 22 kg. and for 1 year old female is 21.0 kg. For the sheep with two teeth the body weight in male was 24.5 kg. and in female was 23.0 kg. The body weight of adults was 27.0 kg. for males and 24.5 kg. for females.

The udder size in ewes varied from small to medium in limited number of individuals examined. The teats are small in size.

Reproduction

The first lambing occurs at about 1½ year of age. Edka sheep farmers claim to have two lambings in 12 to 14 months with 85% twinning and 10% triplets. Most of the farmers have different opinion on triplet birth, while some farmers considered triplet birth beneficial and even rear weak lambs with cow's milk others favour only twins and not triplets because of poor survival and growth due to poor mothering ability. There are two main breeding seasons, one during the month of Asadha and Srabana (July and August) and other during Margasira & Pausa (December & January).

The males are selected based on basis of their physical conformation, vigour and body weight. Usually no selection is practiced in females. Ewes which are old and unsuitable for reproduction are culled. Mating among rams and ewes is controlled. The breeding male to female ratio in the flock varies from 1:20 to 1:30. There is no exchange of breeding males between the farmers.

The males, which are not required for breeding are sold about one year of age but are not castrated. Milk production is adequate to meet the requirement of the lambs.

Genetic Characteristic

No studies have been conducted so far.

4. Breed uses and special qualities

Main uses

The Edka sheep are primarily used for production of mutton. The other product of economic value is the skin, which is used for a variety of purpose. The wool is of poor quality and hairy. The sheep manure is claimed to have high value for fertilizing the cereal crops and vegetable fields.

The Edka sheep is also of special significance to the owners as they are used in various socio-cultural purposes such as given as gift and sacrificed on religious/ social functions.

Special qualities

Edka sheep have been raised by the Yadava community of Orissa since long without any vaccination and administration of medicines for control of diseases. Vaccination against important sheep diseases and use of anthelmintics against internal parasites is a recent phenomenon. Inspite of this, the sheep population has survived over the years suggesting these sheep are relatively resistant to most of the sheep diseases. They are well adapted to high ambient temperature and other climatic conditions especially high humidity. They stand well to heavy rainfall condition. The Edka sheep with medium body weight and high prolificacy offers future opportunity for commercial and intensive production of meat.

5. Management Conditions

Type of management

Edka sheep are mostly raised in smallholder production system. The family flock size varies considerably from as low as 15 to 20 to as high as 200. These sheep are raised in the open but nearer to the house unlike Ganjam sheep, which are maintained away from home throughout the year. Shelter is provided during night and adverse weather condition by some families but not by all. Several families join together for appointment of shepherd for grazing of the sheep. Usually, one shepherd is employed for every 100 to 150 sheep. Every sheep farmer contributes to the wages proportional to the number of sheep he has to graze. The sheep owners are usually farmers. However, the sheep move from place to place within a limited area for purpose of grazing and are brought back to the village in the evening. During rainy season they are move to uplands temporarily. The lambs are raised at home till one to two months of age and suckle their mothers before they are taken over for grazing and after they return to owner's home. The sheep flock usually consists of a large number of ewes, few breeding males and lambs below one year of age. The sheep are supervised for physical condition and any disease condition both in morning and evening.

Predation is a problem in some places. Mosquito bite is a major problem and causes annoyance which affect sleep and consequently production performance. Most of the Edka sheep farmers therefore, keep the sheep covered with mosquito net made like a house during night.

Edka sheep live mostly on grazing and are not supplemented with any feed, minerals or other feed additives. Salt is provided only during rainy season.

The most common diseases encountered in these Edka sheep are enteritis, pneumo-enteritis and PPR. Indigenous medicines were earlier used by the farmers for maintaining the animals of the breed but for control of these diseases usually they take the help of Veterinarians in recent years. The sheep are vaccinated at present against PPR and also given anthelmintics for control of gastro-intestinal parasites.

The lamb mortality is about 20%. The common causes for lamb mortality are morbidity due to inadequate milk production, diarrhoea, pneumonia and predation. The adult mortality amounts to 10% due to disease, predation and theft.

6. Performance trait information

Estimates of genetic distances from other breeds

No information available.

Analysis of genetic material

Not available.

Description of conservation Programme in operation

The population of Edka sheep is fairly large at present. No conservation and improvement programme exists.

The breed needs improvement in scientific line to explore its prolificacy and medium body weight in commercial scale. The breed to be patented in the name of local farming community who has developed them. The future scope for improvement of the breed is commercial lines and conservation is bright.

EDKA SHEEP

Edka Sheep Flock, Khurda

Edka ewe with triplet

Edka Ram

Edka Flock Housed under Mosquitonet, Khurda

Edka Flock

Edka Twin Lambs

GANJAM

1. General Information

Species	-	Sheep
Breed/breed variety	-	Breed
Geographical location		
Distribution	-	Ganjam sheep are mostly found in Ganjam, Khurda, Gajapati and Phulbanii districts of Orissa.
Latitude	-	19° - 20° 45′ North
Longitude	-	83°45′ – 85°45′ East
Name, Local names and	-	Ganjam sheep. They are also known as Golla sheep locally.
Information source	-	The information provided in this report on Ganjam sheep was collected through a limited survey conducted in the year 2005.

2. Breed origin and development

Origin

This breed of sheep is patronized by Golla community living in Ganjam, Khurda, Rayagada, Gajapati and Phulbani districts of Orissa. Although no information is available about the origin of the breed, the Golla community has nurtured the breed for hundreds of years.

Wild or primitive breed

It is an established breed of sheep recognized both by the FAO and ICAR.

Recent immigrations to the breed

Golla community does not like to dilute their breed with inheritance from other sheep breeds. As a result no immigration has occurred knowingly in the recent past.

Population size and structure

The population of Ganjam sheep is fairly large and will not be less than 1,00,000. It is raised in flocks along with Ganjam goats. The flock size with the owner varies greatly from as low as 30 to as high as 400. The family flock comprises of rams, ewes, and lambs. The breeding male to female ratio is usually maintained at 1:10 to 1:20.

Trend in number of females

(Increasing, stable or decreasing)

The number of breeding females is increasing over the years since Ganjam sheep is well known for its meat, and demand for meat is increasing. The population of breeding females will not be less than 20,000.

Risk status - Not at risk

Artificial Insemination usage,

Storage of semen and embryos

Not practiced so far.

3. Breed Description

Mean values for the traits measured in the Ganjam sheep along with their mean are presented in Table-12.

Coat colour

The predominant coat colour is brown to dark tan with whitish abdomen intercepted by a longitudinal black line extending upto hind legs and more than 90% of the sheep conform to this coat colour although intensity varies. In down South, the body coat is white with or without black and brown patches. Few of the sheep exhibit white spots on their face and body. Less than 5% of the sheep were also found to be black in colour.

Ear & Head

Ears are medium in size and drooping type. Ear length varies from 9 to 14 cm. in males and 14 to 18 cm. in females. Head is straight and slightly convex in middle. Head length varies from 23 to 28 cm. in males and 25 to 26 cm. in females. Head colour is same as the rest of the body except in some individuals, which have some white patches on the head. Beard and wattles are seen only in few individuals. Neck is small to medium in length.

Number and description of horns

The males have horns. The females are polled. The horns in males extend backward, downward and forward. The horn length varies from 12 to 33 cm.

Hair and wool type

Body coat is hairy and short.

Body size and weight

The Ganjam sheep is a medium sized animal with relatively long legs. Males are larger than females both in size and weight. Most males and culled females are slaughtered for meat. Chest girth, paunch girth, girth of neck and thighs, height at withers, distances between point of wither and hip joint, and distance between hip joint and shoulder joint were measured in Ganjam goats to describe their body size besides body weight. Males were heavier and taller than females. The chest circumference, paunch circumference, neck circumference and thigh circumference were higher for males than females. The average adult body weight in the flocks surveyed in this study was 29.0 kg. for females and 35.0 kg. for males. The average body weight at birth, 3 months, 6 months, 9 months and 12 months of age respectively were reported to be 2.5, 10.5 14.9, 19.1, and 21.4 kg. for males and 2.61, 9.45, 13.50, 17.5 and 18.9 kg. for females by OUAT centre of network project on sheep improvement during 2002-03. The pre-weaning growth rate was 89.4 g. in males and 79.9 g. in females whereas post-weaning growth rate was 10.1 g. for males and 3.5 g. for females (Project Coordinator's Report, Network Project on Sheep Improvement, ICAR, 2002-2003).

The udder size in ewes is small so also is the size of teats.

Table-12 : Mean values for various traits measured in adult Ganjam sheep

Name of the Trait	Male		Female	
	Number of observations	Mean	Number of observations	Mean
Horn Length (cm)	24	24.6	72	Polled
Ear Length (cm)	24	10.5	72	14.2
Head Length (cm)	24	25.2	72	23.4
Chest Circumference (cm)	24	79.2	72	74.8
Paunch Circumference (cm)	24	84.8	72	84.5
Neck Circumference (cm)	24	45.3	72	33.9
Thigh Circumference (cm)	24	43.0	72	38.8
Height at withers (cm)	24	70.8	72	66.3
L1 (cm)	24	57.0	72	56.0
L2 (cm)	24	65.0	72	64.5
Tail Length (cm)	24	11.7	72	9.8
Body weight (kg.)	24	34.8	216	28.6

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

Tail

Tail is thin and medium in length. It varied from 10 to 15cm. in both the sexes.

Reproduction

Ganjam sheep mature at about 9 months of age (first estrous). Males mature late than females. The first lambing occurs at about 20 months of age. 80% of the Ganjam sheep give birth to singles and rest to twins. Single birth is preferred by many since milk production is not adequate enough to maintain the growth of two lambs. There are two main breeding seasons, one is during the month of Asadha and Srabana (July and August) and the other during Magha & Phalguna (February & March). 80% of the sheep come in heat in July and August and the main lambing season is winter. 70% to 80% of the sheep lamb during this lambing season.

The males are selected based on their phenotypic appearance, vigour and weight. The horn shape and size is taken into consideration. All the ewes are selected for breeding except those which are unable to reproduce due to one reason or other. Usually no selection is practiced in females. Mating among rams and ewes is at random. Both the young and old rams are used for breeding purpose. The breeding male to female ratio in the flock varies from 1:10 to 1:20. There is no exchange of males between the farmers.

The males, which are not required for breeding are not castrated and sold as entire ram at about one year of age.

Genetic Characteristic

No studies have been conducted so far.

4. Breed uses and special qualities

Main uses

The Ganjam sheep are primarily used for production of mutton. The other product of economic value is their skin. The body coat is mostly hairy. The sheep are not

shorn. The sheep manure is used for fertilizing the crop and vegetable fields. Ganjam sheep like Ganjam goats are made to sit on the fields from December to June. Sitting of 100 sheep on a field for one night fetches of Rs.40/- to the flock owner.

Special qualities

Ganjam sheep have been raised by Golla community. It has been reported that Ganjam sheep is fairly resistant to diseases and endo-parasitic infestations. Vaccination against important infectious diseases and use of anthelmentics against internal parasites is a recent phenomenon. They are well adapted to high ambient temperature, high humidity and heavy rains.

5. Management Conditions

Type of management

Ganjam sheep are raised in flocks like Ganjam goats and move from one place to another in search of grazing material. They live in open in the Sun and Rain throughout the year and drink water from the streams, ponds etc. available in their grazing area. The lambs are raised at the Golla's house and brought to the flock during day for suckling. The lambs join the mother and other members of the flocks when they are two to three months old. The lambs are not weaned as a result they go on suckling the mother till next lambing. No additional feed is provided. Sick animals and lambs however, are given special care and are provided additional fodder or culled out. Several families jointly raise their sheep. This reduces the cost of raising. The shepherds who tend the sheep are usually paid Rs.1000/- per month for every 500 sheep. Ganjam sheep and Ganjam goat are raised together and often the flock size is as high as 4000 to 5000. Gollas were using their own system of medicine in the past for treatment of animals. They have now realized that this system of medicine is not adequate enough to contain diseases of sheep. In recent years, therefore, they are taking the help of veterinarians and vaccinating their flock against important diseases. They are also giving anthelmintics for control of parasitic infestations. These efforts, however, are not adequate which sometimes is causing heavy mortality.

Predation is a problem in some places. Mosquito bite is also a major problem and causes annoyance which affect sleep consequently performance of the animals.

The most common diseases encountered are Foot rot, PPR, Contagious Ecthyma and Blue tongue? Endo parasitic infestations are also a problem. The sheep are vaccinated regularly at present against PPR as well as drenched with anthelmintics for control of parasitic infestation.

The lamb mortality varies from 15 to 20 per cent. The common causes for lamb mortality is due to inadequate milk production, enteritis, pneumonia and predation. The adult mortality amounts to 20 per cent due to diseases, predation and theft.

6. Performance trait information

Estimates of genetic distances from other breeds

No information is available.

Analysis of genetic material

Not available.

Description of conservation Programme in operation

The population of Ganjam sheep is fairly large at present. However programmes for conservation and genetic improvement need to be taken up for improvement of productivity of the breed. The breed in general and in specific around Paralakhemundi region is showing fast and heavy growth of lambs. It requires full study and documentation. The breed can excell as best mutton breed.

GANJAM SHEEP

Ganjam ewes and Flock, Chikti, Ganjam district

Ganjam Ewe, Paralakhemundi

Ganjam Sheep Flock, Chikti, Ganjam district

Golla Sheep Farmers

Ganjam Sheep Flock, Chikti, Ganjam district

Ganjam Ram, Paralakhemundi

Ganjam Ram, Paralakhemundi, Gajapati district

Ganjam Sheep & Goat, Rambha, Ganjam district

Ganjam Lamb, Paralakhemundi, Gajapati district

KORAPUT SHEEP

Koraput Sheep Flock

Koraput Sheep Flock

Koraput Sheep Breed (Notched Ears)

Koraput Ram

KORAPUT

1. General Information

Species	-	Sheep
Breed/breed variety	-	Breed
Geographical location		
Distribution	-	Koraput sheep is widely distributed in Koraput Nabarangpur, Malkangiri and Rayagada districts.
Latitude	-	18° - 22° North
Longitude	-	81° - 87° East
Name, Local names and	-	Koraput sheep. In Gunupur area those sheep are known as Dongria mendha or Tikria mendha of the tribals. Based on body size they are classified into three varieties viz. hill sheep of Koraput, Machhkund variety, and Dasmantpur variety. The hill sheep of Potangi, Kunduli areas are dwarf in size and preferred for mutton.
Information source	-	The information provided in this manuscript on Koraput sheep was collected through a limited survey conducted in the year 2005.

2. Breed origin and development

Origin

Koraput breed of sheep has been developed and nurtured by tribal groups belonging to Bhatra, Bhumia, Poraja, and Koya. This sheep is now reared by all in the undivided Koraput district.

Wild or primitive breed

It is an indigenous breed of sheep. It was reported, for the first time, by Kornel (1999) and subsequently by him in 2004.

Recent immigrations to the breed

Not reported. Although it can not be eliminated altogether due to acquiring of these sheep by tribal communities in different occasions from their neighbours from Andhra Pradesh and Chhatishgarh.

Population size and structure

The population of Koraput sheep is fairly large and may exceed 100,000. It is mostly raised in smallholder production system as a part of the integrated farming system involving crop and livestock. The family flock size varies

greatly from as low as 5 to 6 to as high as 50. The family flock usually consists of 1-2 breeding rams, ewes, and lambs. The male to female ratio is maintained at 1:20 to 1:30. Young rams are used for mating and older ones are disposed of.

Trend in number of females

(Increasing, stable or decreasing)-

There is demand for mutton by the tribals as well as in the market. As a result the sheep population is on an increase from year to year. Consequently the numbers of breeding females are fairly large and will not be less than 40,000 to 50,000.

Risk status - Not at risk

Artificial Insemination usage,

Storage of semen and embryos

Not practiced so far.

3. Breed Description

Mean values for different traits measured on Koraput sheep are presented in Table-13.

Coat colour

The coat colour varies widely. The predominant colours are various intensities of brown, black, gray but very small number of black. The head, feet and belly have the same colour as that of the body. In brown variety short brown hairs are seen all through the body. Some have coarse fleece over the body but the belly, face and legs are clean.

Ear & Head

Head is larger in males than in females. Ears are mostly notched and few have medium ears. According to tribals notched ear lobe is an indication of better growth and high body weight. Therefore, they retain rams with notched ear as a breeding ram in the flock. The head is of same colour as that of the body. The ear length varies from 8 to 13 cm. and head length from 17 to 20 cm. The average value for ear length and head length were 9 cm. and 18.3 cm. respectively in the samples measured.

Number and description of horns

The males are horned and the females are polled. The horns in males extend forward, upward and backward and anti-clockwise. The horns look like spirals.

Hair and wool type

Body coat is mostly hairy and some have coarse wool. The length of the wool varies in different locations from 2 cm. to 4 cm. The annual moulting of body coat is observed.

Body size and weight

The hill sheep of Koraput are usually dwarf in size whereas Machhkund and Dashamantpur varieties are medium in size. Heart and paunch girth, neck

circumference, thigh circumference, height at withers and different measures of length and body weight were used in this study to describe body size of sheep in Koraput district. Since young males are used for breeding purpose no data was available on adult males. However, studies carried out earlier have clearly shown that males are larger than females for heart girth, height at withers and live weight.

Table-13 Mean values for various traits measured in adult Koraput sheep

Name of the Trait	Male		Female	
	Number of observations*	Mean*	Number of observations	Mean
Horn Length (cm)	30	9.0	80	Polled
Ear Length (cm)	30	10.0	80	11.0
Head Length (cm)	30	16.3	80	17.0
Chest Circumference (cm)	30	62.8	80	74.0
Paunch Circumference (cm)	30	71.3	80	85.6
Neck Circumference (cm)	30	33.8	80	36.9
Thigh Circumference (cm)	30	30.5	80	33.8
Height at withers (cm)	30	55.5	80	59.6
L1 (cm)	30	41.3	80	48.5
L2 (cm)	30	45.5	80	53.0
Tail Length (cm)	30	8.0	80	8.6
Body weight (kg.)	30	15.0	240	24.1

* No. of observations and mean values on the male sheep of 1 years of age.

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

The mean values for young males were available for the all the traits and are presented in the table instead of adult males for which data was not available since young males are used for breeding. The mean values for females of one year age were 9.5 cm. for ear length, 15.0 cm. for head length, 60.3 cm. for chest circumference, 68.3 cm. for girth of abdomen, 32.3 cm. for neck circumference, 29.7 cm. for thigh circumference, 54.7 cm. for height at withers, 47.0 cm. for distance between point of wither and hip joint, 49.0 cm. distance between hip joint and shoulder joint, 7.5 cm. for tail length and 15 kg. for body weight. No data is available for horn length in females since the females are polled.

The udder size in ewes varied from small to medium in size so also was the size of the teats.

Tail

Tail is small and thin. The tail length in adults varied from 8 cm. to 17 cm. in samples measured. The average tail length for the combined sex was 11 cm.

Reproduction

Koraput breed of sheep, found in Dasmantpur area, are highly prolific. More than 60% of the ewes give birth to twins and rest to singles. Triplet birth also has been recorded in a few cases. Machhkund variety is also a prolific sheep and more than 40% of the sheep give birth to twins. In other regions of undivided Koraput districts most of the sheep of this breed gave birth to singles and very few to twins. The first lamb is born around 14 months of age and there are two lambing during a period of 14 months. This remains consistent for all the sheep of Koraput breed. Most of the lambs are born during November to January and rest during February to April. The winter lambing is preferred by farmers.

The males are usually selected based on their physical conformation, vigour and weight. All the ewes are selected for breeding except those which are unable to reproduce due to one reason or the other. Usually no selection is practiced in females. Mating is random after the selection of males. Usually young rams, less than one year of age, are used for breeding purpose. This remains consistent throughout undivided Koraput district. The male to female ratio in the flock varies from 1:20 to 1:30. There is no exchange of males between the farmers.

The males, which are not required for breeding are not castrated and sold at about one year of age or earlier.

Varietal difference

Hill variety is characterized by coarse wool, short tail, small to medium size, annual single lambing and mainly used for mutton. The Machhkund variety is characterized by coarse wool, short tail, small size, highly prolific, early maturity, twice lambing in 14 months, some give twins and very rarely triplets and solely live on grazing. Dasmantpur variety of Koraput sheep is characterized by early maturity, high percentage of twining, mostly found in Kathargad extending on hills upto Dasamantpur region.

Genetic Characteristic

No studies have been conducted so far except breed characterization.

4. Breed uses and special qualities

Main uses

The Koraput breeds of sheep are used mostly for production of mutton. Manure and skin are also of economic value. The Koraput sheep are also used for various socio-cultural purposes of tribals besides given as a gift or used as a sacrificial animal. The black colour sheep are in demand, especially for ceremonial purposes.

Special qualities

Koraput breed of sheep are resistant to gastro intestinal parasitic infestation. They are also relatively resistant to most of the sheep diseases. They are never dewormed. They adopt to scarcity of grazing material very well during lean period consequently their growth and body is attained during wet season and winter when feed situation improves.

5. Management Conditions

Type of management

Koraput sheep are raised in smallholder production system and usually go for grazing along with other animals of the village like cattle and goat. When the village has a large number of sheep, the sheep farmers join together and appoint shepherds to take care of the sheep. In such cases sheep are taken separately to nearby forest areas and other lands for purpose of grazing during the day and come back in the evening. In most of the places they are raised in houses with raised platform. The houses are made of locally available materials like wood, bamboo, mud etc. Well to do farmers provide better houses for shelter than poor farmers. However, attempt is made by all the sheep owners to construct the house in such a manner, which will protect the sheep from predation of wild animals. The sheep fend for themselves by grazing. Most of the people do not give any supplemental feeding. The lambs raised at home upto 2 months of age after which they are allowed to go in the flock along with the mother for grazing. Upto 2 months, they suckle the mothers both morning and evening, but reared separately from adult stock. They drink water in the streams, rivers, and ponds available in the area during the grazing time. These facilities are available all through the districts. However, when water is a problem outside they are provided water at home for drinking. Predation is a major problem in most of the villages since forest area is very close to most of the villages and many villages are located within the forest area.

The most common diseases are PPR, Contagious Ecthyma, Enteritis and Foot Rot. Endo-parasitic infestations are also seen. Vaccination of the sheep to protect them from major diseases is still a problem due to low awareness among farmers.

6. Performance trait information

Estimates of genetic distances from other breeds

No information is available.

Analysis of genetic material

Not done due to lack of identification, planned breeding and performance recording.

Description of conservation Programme in operation

The population of Koraput sheep is fairly large at present for conservation and improvement instituted for continued availability of genetic variability.

KUZI

1. General Information

Species	-	Sheep
Breed/breed variety	-	Breed
Geographical location Distribution	-	Found in large numbers in coastal districts of Orissa like Puri, Jagatsinghpur, Cuttack and Kendrapara.
Latitude	-	19° 30′ – 20° 45′ North
Longitude	-	85° 0′ – 86° 45′ East
Name, Local names & synonyms	-	Kuzi sheep and Desi.
Information source	-	The information provided in this manuscript on Kuzi sheep was collected through a study conducted in the year 2005.

2. Breed origin and development

Origin

The origin of the breed is not known. Kuzi sheep is highly prolific. High prolificacy in small ruminants like sheep is a most sought trait as it has mitigating affects after onslaught of cyclone and floods in coastal district of Orissa which is frequently witnessed in the home tract of the breed. Probably this sheep has been developed by the farmers to meet these emergencies.

Wild or primitive breed

It is an indigenous breed probably developed by the Gouda (Yadava) community of Orissa.

Recent immigrations to the breed

No immigration has taken place in the recent past since it will affect prolificacy. There is another prolific sheep breed in the coastal district of Puri called Edka. However, Kuzi sheep farmers do not like Edka since mortality rate is high in Edka breed in comparison to Kuzi, when shifted close to coast.

Population size and structure

This breed of sheep is entirely raised under small flock production system. The family flock size varies greatly from as low as 5 to as high as 50. Males and females are maintained in ratio of 1:30 to 1:40. Extra males are castrated at 2 months of age and are usually sold around 6 months of age. The young males are preferred for mating although older males which have expressed their superiority in reproductive performance may also be used preferably in other than the flocks in which they have been used initially. The total population of Kuzi sheep will not be less than 30,000.

Trend in number of females

(Increasing, stable or decreasing)

Due to increase in demand for meat in the state, the population of breeding females is increasing in number over the years and will not be less than 10,000.

Risk status - Not at risk

Artificial Insemination usage,

Storage of semen and embryos

So far sheep are reproduced through natural breeding.

3. Breed Description

The mean values for different traits measured on Kuzi sheep are presented in Table-14.

Coat colour

The predominant coat colour of Kuzi sheep is golden yellow to light gray and very small number of black. Black coloured animals are more in demand as they are sold at a premium price.

Table-14 Mean values for various traits measured in adult Kuzi sheep

Name of the Trait	Male		Female	
	Number of observations	Mean	Number of observations	Mean
Horn Length (cm)	8	Polled	55	Polled
Ear Length (cm)	8	6.0	55	11.3
Head Length (cm)	8	15.0	55	15.0
Chest Circumference (cm)	8	68.0	55	69.0
Paunch Circumference (cm)	8	72.0	55	77.0
Neck Circumference (cm)	8	33.0	55	33.5
Thigh Circumference (cm)	8	25.0	55	23.5
Height at withers (cm)	8	61.0	55	60.8
L1 (cm)	8	50.0	55	49.3
L2 (cm)	8	57.0	55	52.3
Tail Length (cm)	8	12.0	55	12.3
Body weight (kg.)	8	21.0	150	19.3

L1= Distance between point of wither and hip joint.

L2= Distance between hip joint and shoulder joint.

Ear & Head

Ears are straight and extend horizontally. In few sheep slightly dropping ears were also seen. In the samples measured the ear length varied from 8 to 13 cm with no difference between the sexes. Head is slightly small, straight and varied from 14 to 16 cm. in length with no difference between the sexes. In our study small wattle were seen only in one of the sheep. Body weight of adult Kuzi sheep measured in this study varied from 16 to 22 kg.

Number and description of horns

Both the sexes of the Kuzi sheep are polled. In very few cases males small horns are seen.

Hair and wool type

Body is covered with short dence coarse wool. It has high percentage of hair and is greasy. The legs and face is clean. The wool is not clipped during any time during the life of the sheep. The coarse wool protects the sheep from rain, water and wet floor.

Body size and weight

Kuzi sheep is characterized by its small body weight. Studies carried out Kuzi sheep in Koraput district of Orissa has shown that Kuzi ewes when crossed with rams of heavy Indian sheep breeds e.g. from Rajsthan but the crosses did not show any significant gain either in body weight or growth (Kornel, 1999). Results obtained from Koraput study suggest that the low body weight of Kuzi sheep may be due to QTL gene effects. The farmers of the area were breeding Kuzi sheep has reported improvement in body weight of Kuzi sheep through intra-population selection of breeding males for live weight around one year of age. The adult body weight in the sheep included in the study varied from 18 kg. to 22 kg. with

an average of 19 kg. Medium size Kuzi sheep called Desi in undivided Cuttack district, especially in Jagatsingpur region are reared by Gouda families.

Tail

Tail is small and thin. The average tail length on the samples measured was 12.0 cm. for males and 12.3 cm. for females.

Reproduction

Kuzi sheep is well known for its prolificacy. More than 80 per cent of the ewes give birth to twins and another 10 per cent to triplets. Quadruplet births have also been recorded. First lambing occurs around one year of age and twins are not uncommon. Studies carried out in Koraput district suggest that prolificacy of Kuzi sheep found in coastal districts of Orissa is due to Booroola gene as reported for Booroola Merino sheep in Australia. Two lambing occurs during the period of 12 months. Although lambing occurs throughout the year there are two major breeding seasons, one during February and March and the other during July and August. Lambing during rainy season is not preferred as it causes high mortality in lambs.

Males mature early than females. Usually young rams are used for mating until unless highly superior rams of older age are available. The udder is well developed in ewes and the milk produced is adequate enough to take care of twin births. The lambs are not separated from their mothers till next lambing. Farmers feed triplet born lambs with cow milk. Some farmer prefer triplets, but many prefer twins.

Genetic characteristics

No genetic studies have been undertaken except those reported above i.e. age at first birth, number of lambs born per lambing and crossing of Kuzi ewes with rams of heavier breed from Rajasthan.

4. Breed uses and special qualities

Main uses

It is a breed primarily used for production of meat. The skin and manure are of commercial value and sold. No shearing is done.

Special qualities

The animal of this breed possess the ability to survive, produce and reproduce at a low plane of nutrition and highly adaptable to its habitat and relatively more resistant to gastrointestinal parasitic infestations.

5. Management Conditions

Type of management

Kuzi sheep are raised in small holder production system and meet their feed requirements by grazing on natural vegetation. They are kept at home during night in special sheds made for them. The sheep sheds are usually made of locally available materials like wood, bamboo and straws. Animals are provided feed at home besides grazing and this varies among families rearing these sheep. Chuda, oil cake, groundnut leaves are given as supplemental feeding. Like goats they are not provided any salt lick. They go for grazing along with the cattle and goats. Only in few instances the different sheep farmers of the village join together and send the sheep and goats separately for grazing purpose. Farmers even tie adult ewes with lambs to a small pole for grazing. Predation is a problem only in those villages near to the forest or within the forest. Kuzi sheep possess the ability to go and graze in the water as well as in the muddy conditions which the goats do not like. The common diseases are PPR, gastro-intestinal parasites and Ecthyma. Vaccination is being practised at present against PPR.

6. Performance trait information

Estimates of genetic distances from other breeds : No information is available.

Analysis of genetic material : Not reported so far.

Description of conservation programme in operation : Do not exist at present.

KUZI SHEEP

Kuzi ewe with triplet, Konark

Kuzi ewe, Cuttack

Kuzi flock grazing, Cuttack

Kuzi Ram

Kuzi sheep flock, Konark

Kuzi ewe, Konark

Kuzi sheep of Cuttack district

Kuzi ewe with twins, Konark

Kuzi Ram

People of Orissa who have contributed to the development of native Sheep and Goat breeds

PORAJA

Poroja, Paraja or Parja is the Oriya version of the Sanskrit word Praja meaning the common people. The name Poraja, according to Thurston and Rangachari (1909), is derived from the Oriya words Po and Raja (son and king). Thus Poraja stands for sons of kings. The anthropolical notes describe Bodo and Jhodia Poraja as two main sections. The Jhodia Poraja are also known as Sano Poraja and Desia Poraja tribe. The Jhodia are considered as loyal, more quiet and nice people.

Bodo Poraja family

The Jhodia Poraja village has a well organised socio-political system. The traditional village council has the Jani as the saurdotal head. The secular head is known as Muduli who is assisted by the Challan. These three important persons along with a few selected village elders regulate the socio-cultural and even economic life of the village. The magico-religious functionaries of the village are called Disari, Gunia, Bhattanayak and Gurumai. Their presence is required in all village and family functions.

Agriculture is mostly rainfed dependent. They grow rice in jholla land, and grow millets on uplands which is followed by alsi a oilseed crop. Quite a number of crops ranging from cereals, oil seeds, small millets and vegetables are grown by the Poraja.

Ragi is their staple food.They are also very fond of livestock and poultry.

Bodo Poraja are good farmers, but land fertility and environment degradation is their primary problem. The Koraput sheep breed with twins and early maturity has been developed by Bodo Poraja, Bhattra and Bhumia tribes of Koraput district.

Koraput Sheep breed, ewes with twin lambs.
(Jhodia Poraja Village)

KOYA

Koyas tribe live in Northern catchments area of the river Godavari spreading across the boundaries of the neighbouring districts of the State of Andhra Pradesh, Chhatisgarh and Orissa. In the latter state, they are mostly concentrated in Malkangiri, Korkunda, Kalimela and Padia blocks of Malkangiri district. Kornel (2006) has described the culture and changes in Koya tribe of Malkangiri district in Orissa.

The Koya country has the capacity of sustaining two basic economic activities namely agriculture and livestock viz. cattle and goat rearing.

A Koya Family

Rice is their staple food. Apart from it they grow pulses and vegetables. They have special liking for liquor-particularly the sago palm juice, rice and *ragi* beer and liquor distilled from rice, *mahua* flowers and pulp of mango and jackfruit.

The Koyas subsist on agriculture as well as on shifting cultivation.

They keep different species of livestock and poultry. Cattle are kept for draught activities and for milk in Motu region. They are dwarf in size and are called Motu breed. The households with large holdings of livestock are ranked wealthy. They do not milk cows except in Motu region.

Pigs are reared for pork and for sacrifice before the deities. Poultry are reared under scavenging system and they seldom eat eggs. The tribe has lived around a cattle centered economy. The goat is well bred, and is one of the heavy weight, fast growing and early maturing type. They are known as Malkangiri goat breed; the Matia tribe grow a good meat type Malkangiri goat breed too. The Koyas leave a goat buck, for ceremonial purpose called, 'Perma Maka' which is similar to Hindu concept of Sacred Bulls. Koyas are fond of cock fighting and are important partners in the evolution of the famous Vezaguda poultry breed. It is shared with Matia, Bhumia, Bhattra and Dom Caste people as principal breeders.

SABARA

The Sabara tribe is one of the largest tribe distributed throughout Orissa. They are not only found in South-east of the Kandha Country in the districts of Gajapati, Rayagada by the synonyms Saora, Sora, Saura and Soura but also in other districts by the names Shabar, Sabar and even Savara. According to the geography of the place of their habitation, they are known either as Hill Sabaras or plain/ low country Sabaras.

Sabara prefer to live in small villages situated at the foothills or across the contour of the hill slopes. In big and medium sized villages the houses are arranged in rows facing each other.

A Sabar Family

Rice and ragi form the staple food. Ragi gruel is most relished diet. They love to eat vegetables, edible leaves, roasted or boiled meat.

All express faith and severe the Kuden (male shaman) and Kudenbai (female Shaman). A Shaman is a diviner-cum-medicine man (Mohanty, 1990). The Buyya is the village priest. The astrologer of the village is known as Disari. The post of Disari is achieved by a male person of the community.

A Sabara village is self-reliant in governance and resources. The affairs of the villages are managed by the traditional Panchayat headed by a secular head man Gamang as well as the religious headman Buyya.

The Sabara economy veers around agriculture. Rice is grown mainly in terrace fields. Sabar are well known and admired for their engineering skills. The up lands and hill slopes are used for raising maize, small duration paddy, coarse cereals and millets of various kinds. Shifting cultivation is said to be their life supporting economic pursuit.

Every Sabara household owns different species of livestock and poultry. The livestock has a socio-religious-economy relevance to their life. The animals are left early in the morning to fend for themselves. They are one of the breeders of Bolangir sheep in Western Orissa.

GOND

In Orissa Gonds are distributed all over the western parts comprising the undivided districts of Kalahandi, Sambalpur, Koraput and Bolangir. Their presence is quite significant in the blocks of Sinapalli, Dharamgarh and Khariar as the farmers.

They are divided into several exogamous clans like Hitam (Hetam), Markam, Veti, Mori, Sori etc.

Gond Marias are divided into several exogamous totemistic divisions (sibs) of the likes of Kachhim, Baga, Chheli, Nag, Makadi, Pandki, Bariah and Kakoli etc. They go by nuclear family system, practice monogamy and go for the arranged marriage.

Gond tribal women in the weekly market

The Gonds are good agriculturists and grow a variety of crops seasonally. They raise domestic cow, buffalo, goat, sheep, chicken and duck.

They have bred and developed the Raighar goat breed. The pasture and feed availability in the region supports cattle and goat keeping.

SANTAL

Risley (1891) described Santal a large Dravidian tribe, classified on linguistic grounds as Kolorian and mostly found in western part of West Bengal, Northern Orissa, Bhagalpur and Santal Praganas.

In Orissa, Santals are found in large numbers in the districts of Mayurbhanj, Keonjhar and Balasore. The Santals predominate other tribes in the blocks of Rairangpur, Jeshipur and Bahalda. Quest for livelihood under the non-farm sector made them to fan out into the neighbouring districts of Angul, Dhenkanal, Sundergarh, Sambalpur, Jajpur and even Cuttack. The Santals speak a language known as Santali belonging to the Munda group of languages falling under the category of the Austro-Asiatic sub family of the Austric family of languages. However, they know Oriya very well.

Santal family

Rice is the staple food. It is occasionally substituted by minor millets, maize and wheat. They are fond of vegetables, pulses, meat and dry fish. Handia is their traditional beer. It is also offered to family as well as village deities on special occasions.

Traditionally the Santals are the agriculturists who practice dry cultivation on rain fed uplands and wet cultivation in fertile lowlands. They raise a variety of crops ranging from paddy, maize, pulses, oil seeds and vegetables to sabai grass and bamboo.

A wide variety of livestock and poultry are domesticated by the Santals. They use animals like bullock, buffalo and even cows for their agricultural operations. They grow goats and sheep for meat and sale. They keep pigs to subsist on kitchen and farmyard waste. Invariably all Santal families keep chicken, pigeon and duck while a few rich among them take the pride of keeping swan.

GOLLA

The Sanskrit word Gopala meaning, those who tend cattle is the parental vocable of Golla, a semi-nomadic community inhabiting in coastal areas of Central India to east of the Eastern Ghat mountain range. At one time they were wandering along with their animals across the coastal areas south of the river Mahanadi down to north of the Godavari. In Orissa, the Golla or Gulla are also known as Yadav who speak Telugu. They are now concentrated in Ganjam district (Singh – 1998). The other phonetic variation of Golla or Gulla is Gola. They mostly live in the blocks of Kanisi, Rangailunda, Purushottampur and Chhatrapur of the Ganjam district.

Linguistically the Orissa Gollas are divided into two groups namely the Oriya Golla and the Telugu Golla. The former is divided further into three sections by the names Chhelia Golla, Khadua Golla and Baladia Golla, among these three the Khadua enjoys the highest social status followed by the Baladia. Numerically Chhelia Golla is the lowest in their caste hierarchy. Thurston reported the existence of three sub-divisions of Golla by the names i) Erra or Yerra –they are descendants of a Brahman by a Golla woman; ii) Ala or Makala who tend sheep and goat and iii) Gangdodu who exhibit performing bulls. These words being drawn from the Telugu vocabulary and one may easily infer that these are various sub-groups of Telugu Golla. According to Singh (1998) the Gollas have four occupational sub-groups and sport four different prefixes namely a)Nunia (trader of salt), Haladia (trader of turmeric), Panera (trader of betel leaves) and Chhelia (keeper of goats). These Oriya words signify that the neighbouring Oriyas might have classified the Telugu speaking Gollas or the Oriya Gollas into above mentioned occupational groups.

Golla sheephards in Rambha forest

In social hierarchy, the position of the Golla is fairly high, for they are allowed to mix freely with Kapu, Kamma and Baliga and the Brahmans who take butter and milk from their hands (Thurston and Rangachari, 1909). In Orissa the word Golla refers to the Telugu Golla who use Patra as their surname. They have two clans Pourantalu and Madapallu and a number of lineages such as Tangan, Sinni, Dergari, Karai, Kariyal and Chappa. (Singh -1998). Oriya Gullas have four distinct sub-groups namely Kagad Gulla, Dandu Gulla, Era Gulla and Alu Gulla. From among the four the Era Gulla enjoys the highest social status because they not only keep a large number of goat and sheep but also own cattle and agricultural lands. The Oriya Golla accept cooked food from Brahman, Karan, Gauda, Gudia, Barik and do not share water sources and crematoria with Hadi, Mochi and Dom (*ibid*) and sport surnames like Mohanty, Jena, Deo, Dara Bhuinya, Bora etc.

Most of the Gollas – the Oriya Gollas in particular; at present are the land owners practising agriculture but still own ruminants to keep up their traditional occupation. The Telugu Gollas on the other hand keep large flock of goats and sheep – sometimes, even more than 500 heads, to make a living. They have intiperulus, which show their lineages.

Golla family

Gollas/Gullas worship both their own deities and Hindu pantheon. Both Oriya and Telugu Gollas consider Lord Krishna as their community God. The Oriya Gollas revered Lord Jagannath to a great extent while the Telugu Gollas (Gullas) worship Thakurani, Rajamma and Konallama.

Traditionally the Golla are the cattle breeders and shepherds who earn living out of selling milk and milk products. The Ganjam Gullas keep two varieties of goat. They are the Bangiri and Dalua. The three varieties of sheep they breed are the Bedi (Dalua) Mendha, Mamula Mendha and the Bangiri Mendha. These sheep and goats are classified as Ganjam and Dalua sheep/goat breeds in livestock literature. They do not keep pig.

The literate Oriya Gollas, at present concentrate more on agriculture to subsist. Gollas of either language group are yet to consider the livestock as the economic asset with great liquidity and versatility and capable of yielding income at shorter interval, is the opinion of Anthropologists. The Gollas need to be introduced to modern skills in sheep and goat husbandry as well business plan to be successful as farmers.

BHUMIA

The Bhumia is an agrarian community, which derived its name from the Sanskrit word 'Bhumi' meaning the land.

In Orissa most of them are found in the district of Nabarangpur and in the blocks of Kundra and Boipariguda which is in the Koraput district.

They speak a corrupt form of Oriya which is also known as Basturia. In Orissa there exist two sub-groups of Bhumia namely Bada Bhumia and Sana Bhumia.

The Bhumias are divided into a number of exogamous septs called Bansa like Nag, Bagh and Surya (Senapati and Mohanty, 1971).

Each Bhumia village or hamlet has a headman called Naik. The post is hereditary. Usually the richest man of the village is conferred with the title Naik. Bhatnaik is supposed to provide leadership to the people of 10 to 12 villages. He settles the village feuds and orders the Nail to settle the disputes of the village under his leadership. Bhatnaik is authorized to convene the meeting of the Naiks and to hold discussions with his counterparts of other groups of villages.

Bhumia women in chair parab festival

Agriculture is their main economy. They supplement their family income with sale proceeds of the domestic animals and poultry. Every Bhumia family keeps goat, sheep, cow, bullock, buffalo and poultry to meet the contingent cash needs and ritualistic needs to appease the village deities.

Bhumias rarely milk the cow. The bovine animals are kept agriculture practices like ploughing and leveling the soil. The women of the tribe take all care of livestock and poultry at home. they act responsibility to bring bu the family and have good say.

The Bhumia tribes-men have developed the Vezaguda poultry breed, Koraput ducks and Koraput sheep breed with other neighboring tribes.

BHOTTADA

The word Bhottada is derived from two words 'Bhu', meaning the land and 'tara' meaning chase (Singh, 1998). The Bhottada has several synonyms as Bhottara, Bottoda, Bhotora, Bhatra, Bhatara, Bhattara and Dhottada quoting Mr. H. A. Stuart the great ethnographer duo Thurston and Rangachari (1909) state that Bottadas are a class of Oriya cultivators and labourers.

The Bhottada villages, through heterogeneous in nature, have secular heads belonging to their community. A Naik heads the village council consisting of village elders. Pujari is the religious head. He is an important member of the village council. The Naik is provided with an attendant titled as Gonda.

The Bhottada economy has strong link with the agriculture. They are skilled in low moisture agriculture; and well known rice farmers. The other sources of income being the collection and sale of Minor Forest Produce (MFP) and wage earning from both farm and non-farm sectors. They keep cow, bullock, buffalo, goat, sheep, chicken and duck. They have abandoned pig keeping. Infants are given the milk of cow and goat whereas the sheep is not milked. The local variety of hen and duck lay egg continuously for ten to twelve days which they either eat and sell. Goats and Sheep (particularly the male ones) are used as sacrificial animals and slaughtered to prepare festive dishes. The surplus are sold in the market.

Bhottada lady with traditional leaf made rain dress

They breed Raighar goat breed and Koraput sheep breed. The women take more responsibility of households than men; and Bhattada are well known agriculturists especially in low moisture context. In this book we have referred Bhottada as Bhottras.

KONDHA

The word Kondha, according to McPherson, has been derived from the Dravidian word 'Konda' meaning hill. It has other phonetic variations like Kandha, Kandh, Kondh, Khand and Kond. The Kondh are hill people (Singh, 1998) and their habitant popularly known as Kandh country stretches across valley bottoms, foot hills, plain lands, uplands and plateaus of the Eastern Ghat mountain range sandwiched between two great river systems namely the Godavari in the south and the Mahanadi in the north.

Kondha women showing her traditional ornaments

Most of the Kondh country lies in the districts (undivided) Phulbani, Koraput and Kalahandi in Orissa. Their population in the State, according to 1991 census, is 11,40,374. The decennial (1981-91) growth rate of the community is computed as 15.27 percent.

Hill Kondhs are scantily dressed while the Desias put on dresses like any other rural folk. The women are fond of ornaments. Kondh women are fond of tattooing their faces. A few Desia males keep long hair to signify their status in the society as a Shaman, priest or a man with mystic power to contain evil spirits. The females attend to their hair lock seriously. They believe that the land belongs to them and others are none but intruders.

Family is the smallest unit in the Kondha social organization and they have nuclear family system. In administrative structure several Kondh villages constitute a Mutha. In each village there still exists a village council headed by Jani, the religious and secular headman. He is assisted by Bishimajhi. The Barika belonging to the Domb or Pana community acts as the village messenger. At Mutha level the Mandal acts as its head. The Desia Kondhs still have the Mutha system symbolically.

The Kondh's belief system centered round the Dharani Penu – the Supreme Being. Meriah Puja or Toki Puja was offered in the past to appease her. At present the Kedu Puja (buffalo sacrifice) is conducted even by the Khonds for the appeasement of the Dharani Penu.

Kondh Man with cigar

The highly vulnerable and very localized Kondh economy is anchored to the rainfed as well as shifting cultivation. They supplement their family income with collection and sale of Minor Forest Produce, wage earning from farm and non-farms sector. Sale proceeds of the produce from Animal Husbandry sector comes as a great help to them during lean periods and observance of festivals as well as rituals. The goats, sheep and pigs domesticated by them are treated as promissory bonds with high liquidity. The poultry birds are reared to get a few coppers to meet the daily or weekly cash needs. The Kondhs consider possession of cows and draft animals reflects ones economic health, more the number wealthier the owner.

Consumption of milk is considered as a luxury among the people of the Kondha belt. Egg is considered as a rich man's food. Kondhs of Narayanapatna have bred Narayanapatna goat breed with other caste people.

GAUDA

The Gauda is a professional caste found all over the State of Orissa under several synonyms like Gopa, Gopala, Golla, Goala etc. Dalton (1873) describes the Gopas a pastoral tribe who have settled down as good farmers and cultivators but possess larger herds of cattle, bestowed great care on them and profit more by the sale of butter and milk. In Madras Census Report Gaudas are described as the great pastoral caste of the Ganjam districts. They claim to be the descendants the legendary Yadav tribe into which Lord Krishna was born. Most of the Gauda consider themselves as emigrants and trace their origin to places like Gopapura, Magadha and Mathura which at present lie in country's so called 'cow belt'. They speak Oriya.

Gaudas are found all over Orissa. In coastal and Central Orissa they are known as Gauda whereas in Western Orissa they are generally called Guala. In Northern part of the State they are known more as Gopala. Invariably all of them take pride of identifying themselves as Yadav.

A Gauda farmer in Khurda district

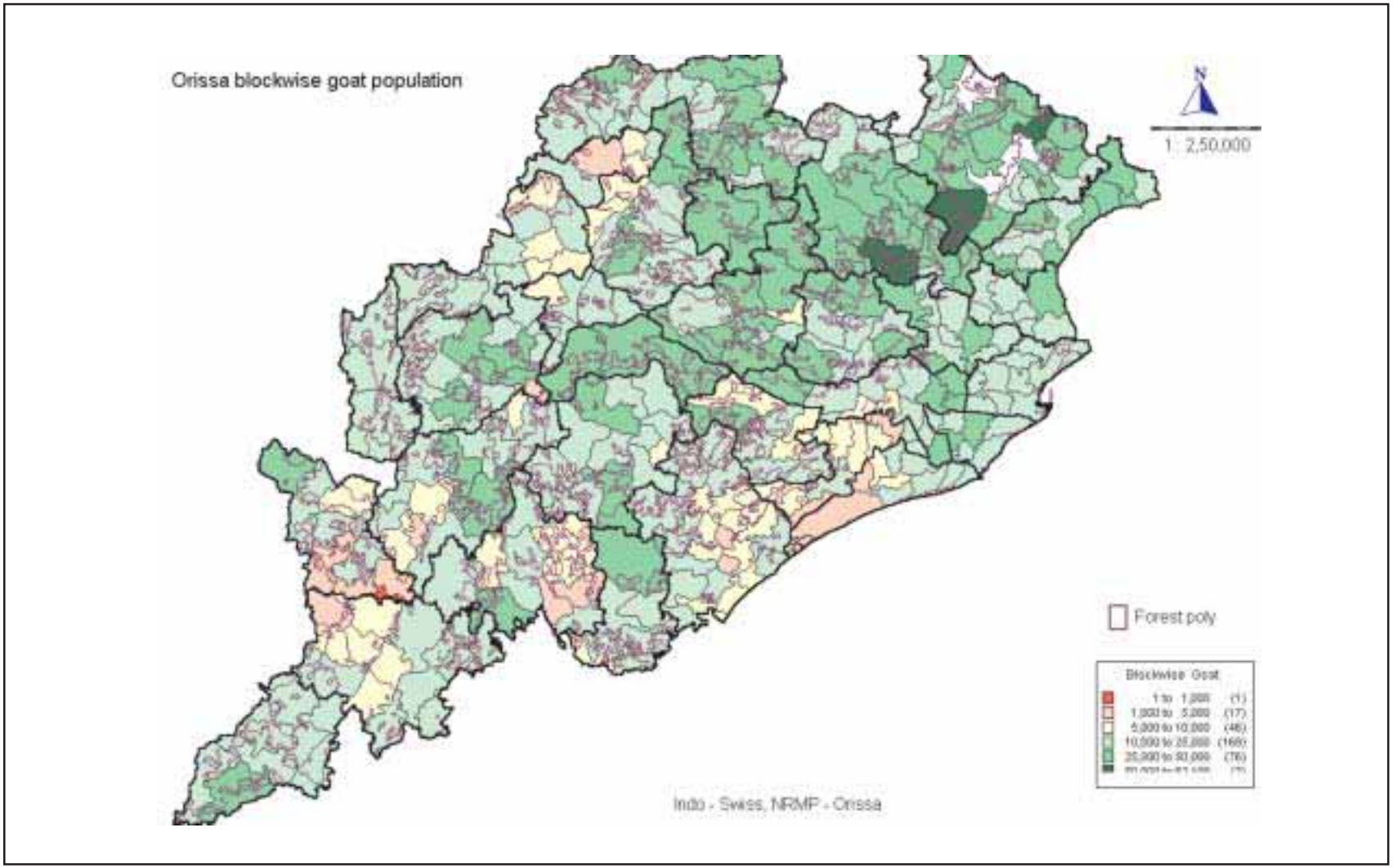
The Gauda has been declared as a socially and educationally Backward Class (SEBC) and accommodated at Sl. No.45 in the SEBC list of Orissa along with Gola, Gopa, Sadgopa, Ahir, Gaur, Gouda, Goudo, Mekala Golla, Punnu Gola, Yadav, Gopal, Gopala, Shola Kandia, Magadha Gauda, Laxminarayan-Gola and Gudia Gola. The Telugu speaking Gulla, in order to avail the socioeconomic packages floated by the Government, have opted to assume their community name as Golla overtly. Majority of the Gaudas of Orissa claim to belong to the Mathurapuria subgroup. Gaudas are found all over Orissa. They are more numerous in the blocks of Nimapara, Pipili, Brahmagiri of the district of Puri.

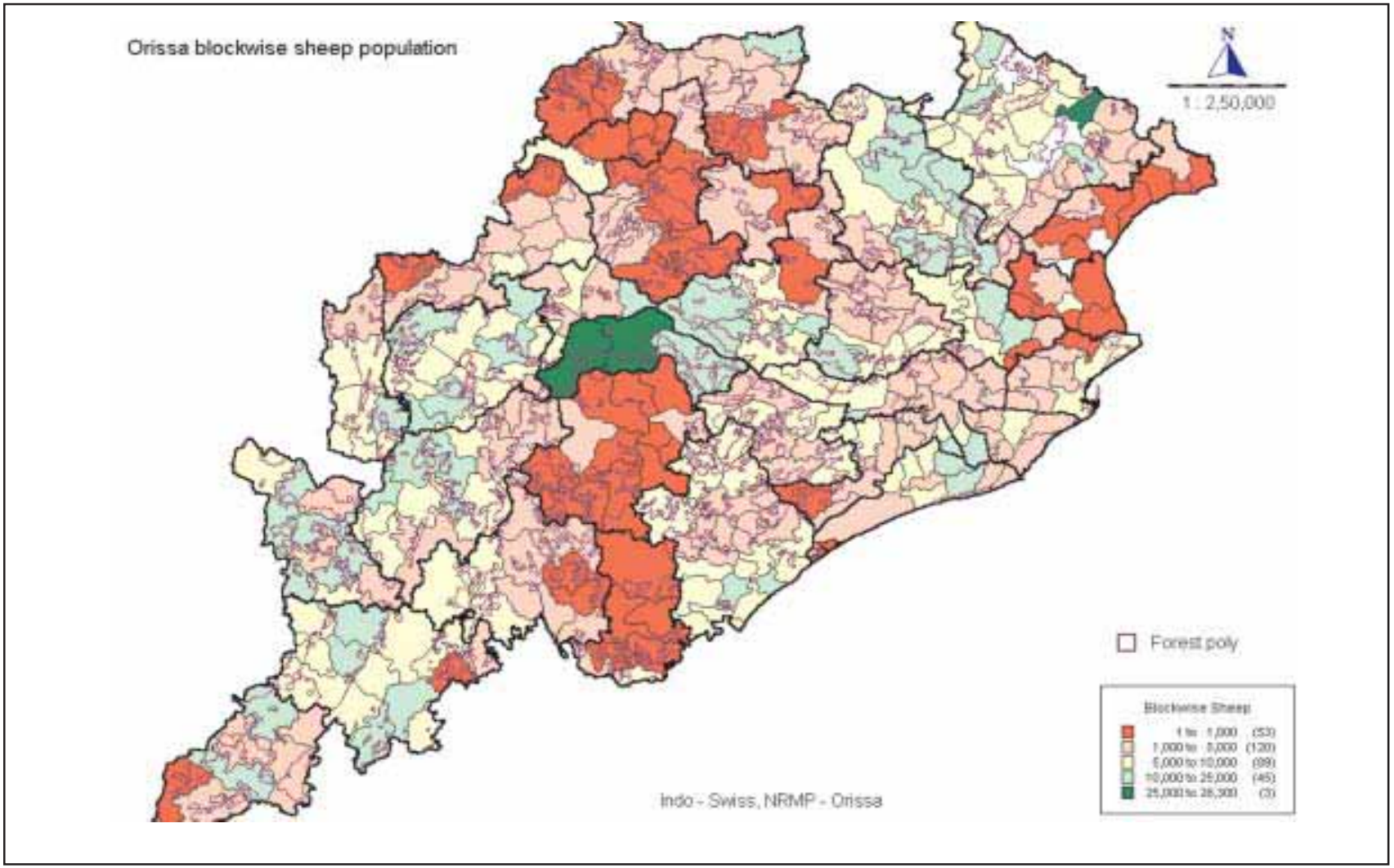
They have four subgroups namely Nanda, Magadha, Juria and Loria (Singh, 1998) but according to place of their ancestors and execution of additional ritualistic duties the Orissan Gaudas of coastal areas are divided into four subgroups like Mathurapuria, Gopapuria, Bahungibuhai and Sabaribuhai. The former two enjoy higher social status and live along with the Khandayats in equal footing. The latter two are counted in labour class because of carrying-burdens with the help of the carrying pole or on shoulder. The Gaudas of Manikpatna, a village near Chilika take pride of serving the Lord Jagannath once with curd and identify themselves as Manikapatana Gauda. This small section claim higher social status. There exists marital relationship between the Mathurapurias and the Gopapurias whereas the Bahungibuhais and the Sabaribuhais establish marital relationship between themselves but muster no will despite of having eye-catching wealth to establish marital relationship with the Gopapurias and Mathurapurias. There exists

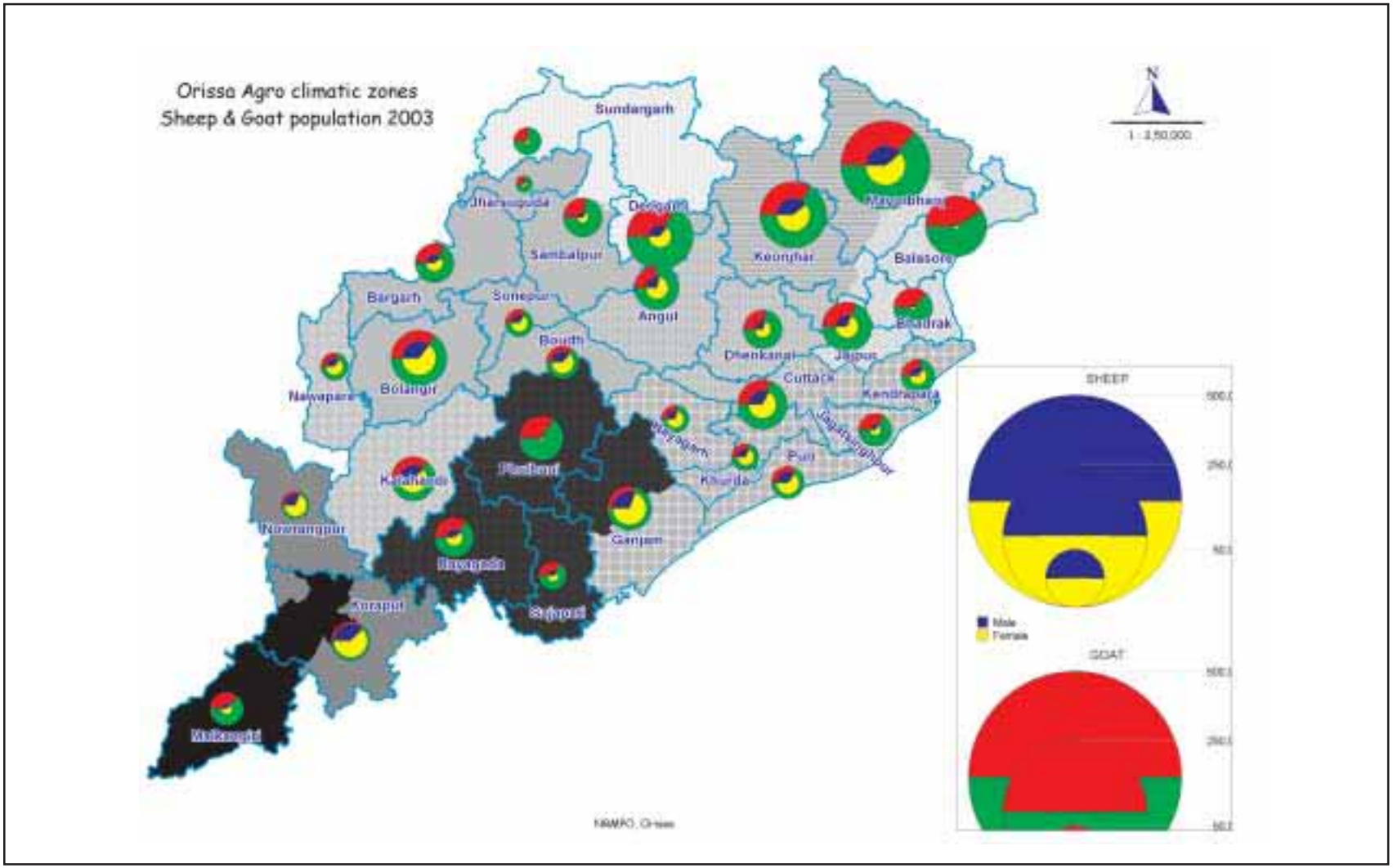
a splinter section of Oriya speaking Gauda with the prefix Chhelia. These Gaudas give away and take in daughters to and from the burden carrying Gaudas. (Bahungibuhai and Sabaribuhai).

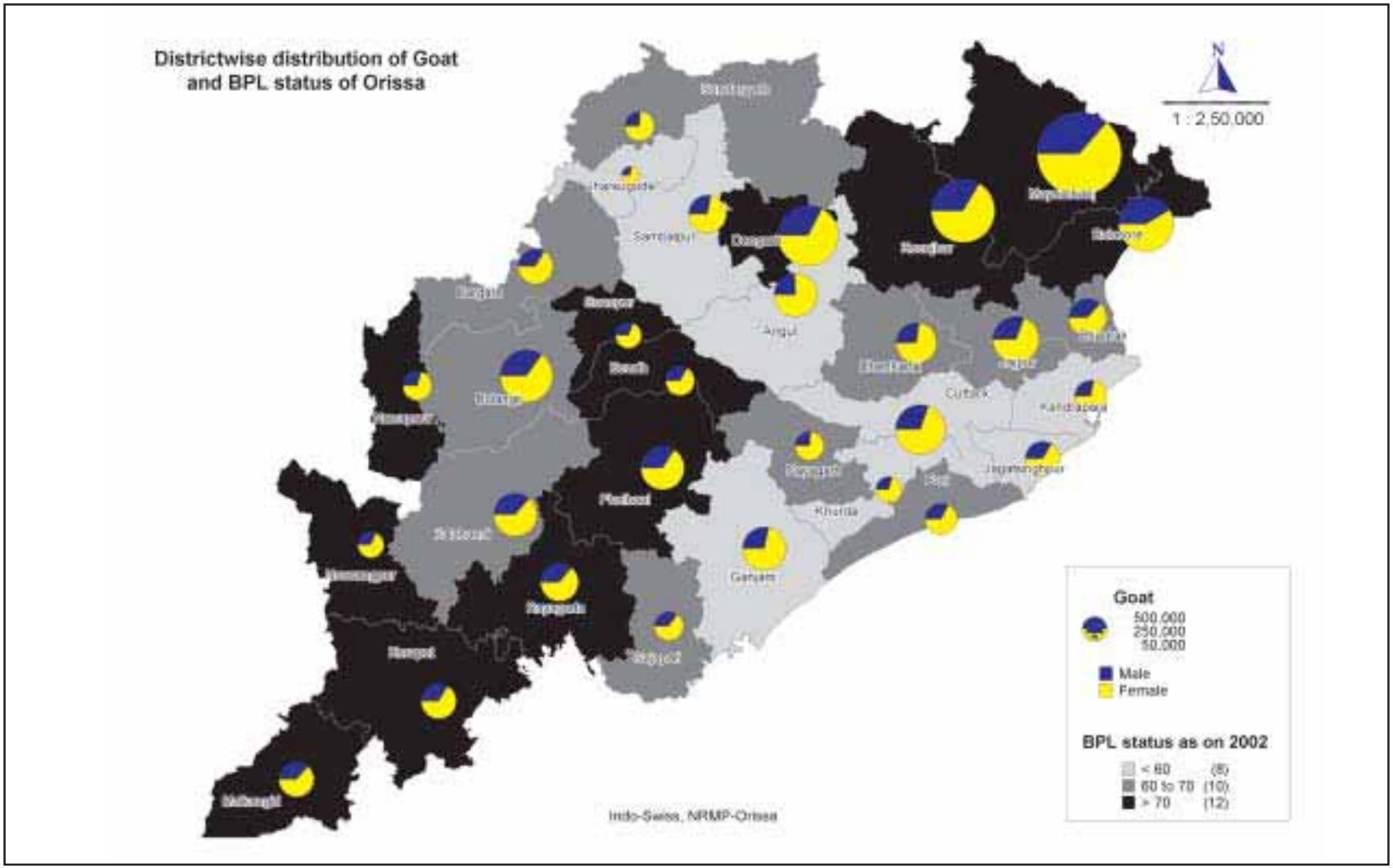
Though belong to the professional caste they are considered clean by the Brahman, Khandayat and Karan and receive cooked food and water from them. Sometimes these clean communities accept the same from the Gaudas. The sweet meal makers (Gudia) are said to have social status equal to their. In Western Orissa the Brahman establish a symbiotic relationship with the Gaudas to perform ritualistic duties.

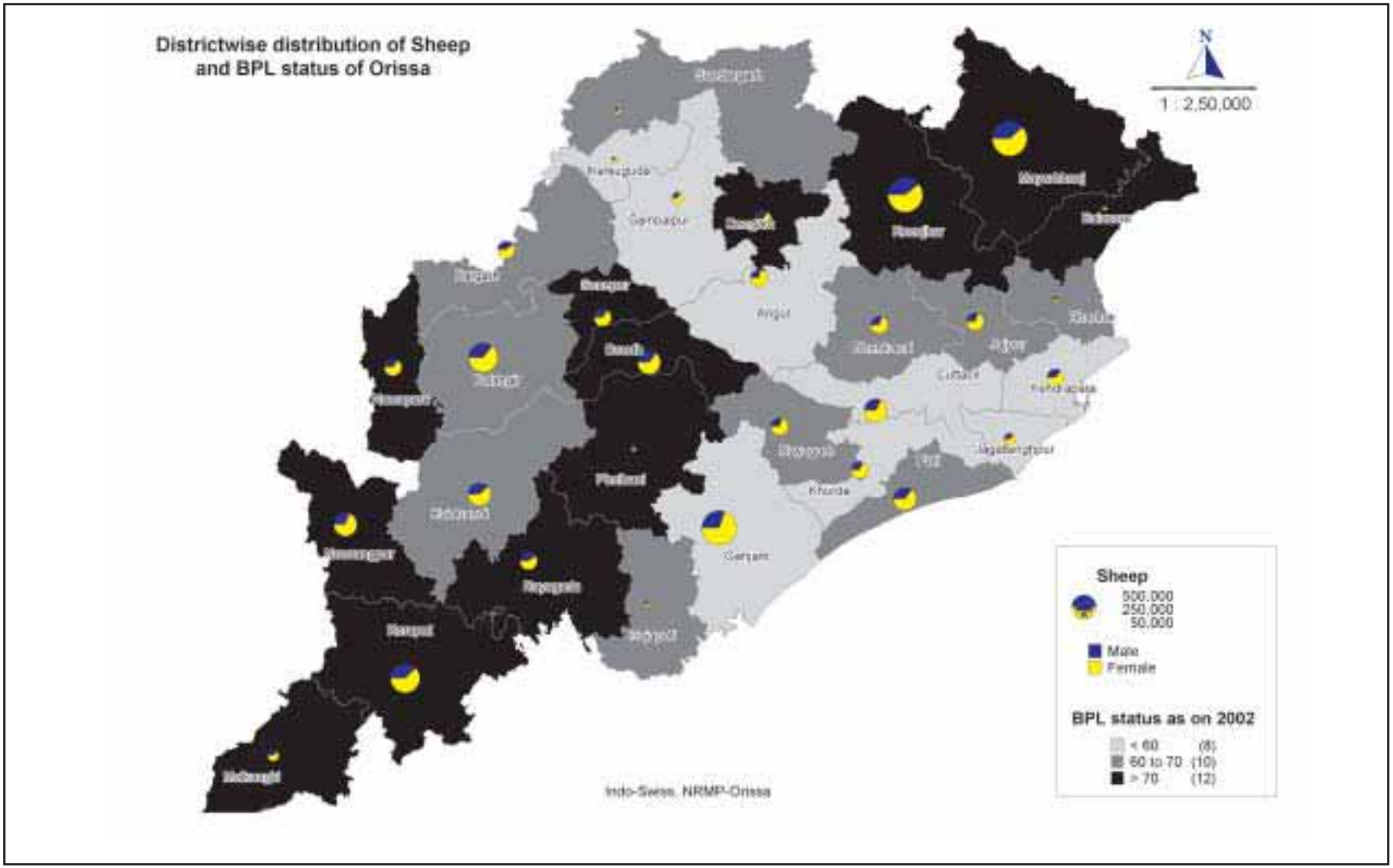
The economy of the Gauda has a strong footing on breeding and rearing of the ruminants. They prefer cow over she buffalo because milk and milk products of the former are used in religious occasions. The coastal Mathurapurias keep large herds of buffalo. The buffalo breed reared are the Baudia and the Kalahandia. They breed goats commonly known as Lankapuria (bigger in size with upright ears), Bangiri (dwarf variety with dropping ears) and Pathuria (the country variety with drooping tail). Their sheep are not wooly, small in size and graze grass along with the cattle. They sale milk, milk products and even dung manure. The poor Gaudas attend to village cattle in lieu of a fixed annual remuneration. A few Gaudas even earn extra income as medicine man attending to the ailments (particularly pain in joints and limbs as well as setting the broken limbs) of both human and animal.

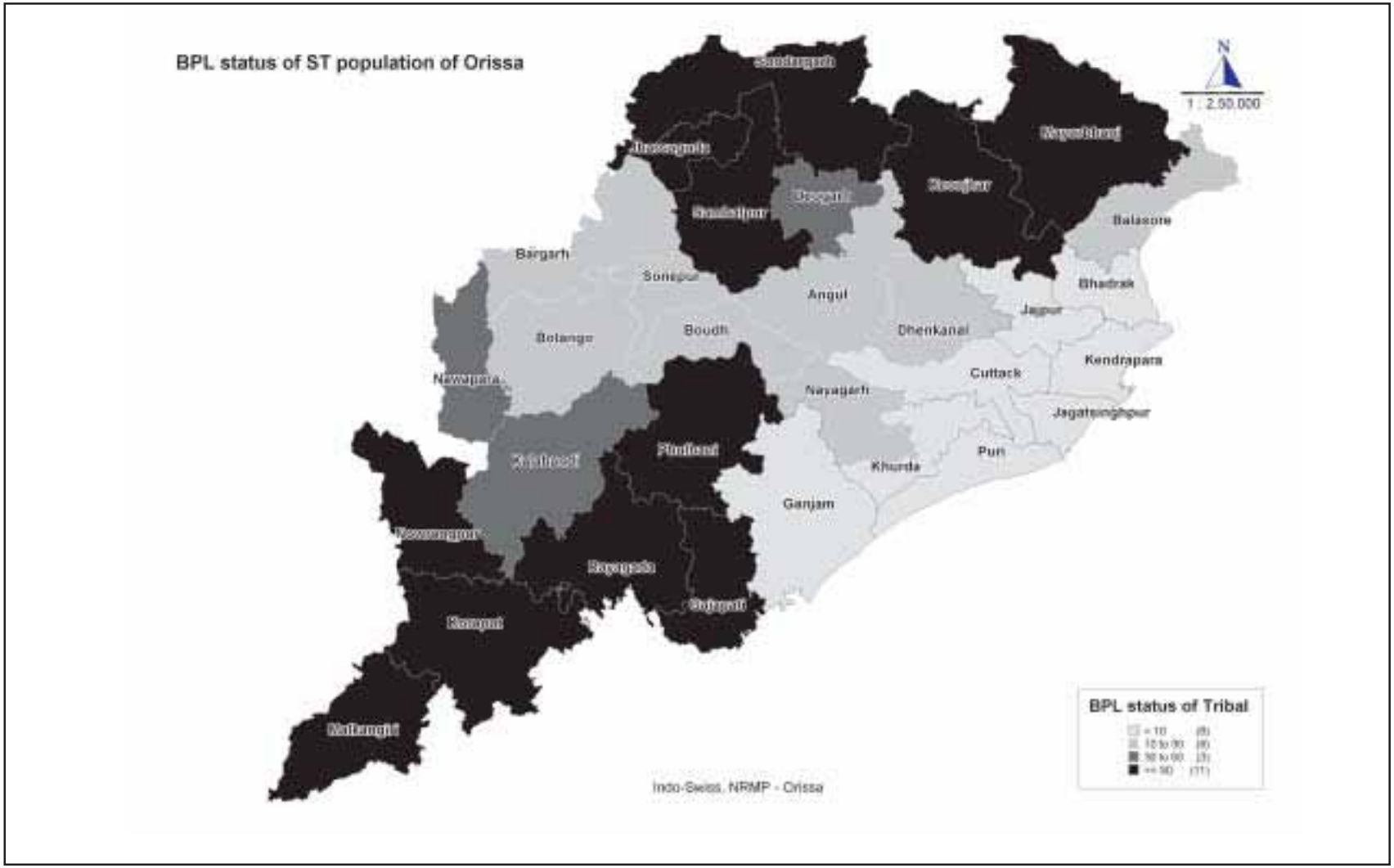

Orissa blockwise goat population
N
1: 2,50,000
Forest poly
Blockwise Goat
1 to 1,000 (1)
1,000 to 5,000 (17)
5,000 to 10,000 (48)
10,000 to 25,000 (168)
25,000 to 50,000 (76)
Indo - Swiss, NRMP - Orissa


Orissa blockwise sheep population
N
1 : 2,50,000
Forest poly
Blockwise Sheep
1 to 1,000 (53)
1,000 to 5,000 (120)
5,000 to 10,000 (89)
10,000 to 25,000 (45)
25,000 to 28,300 (3)
Indo - Swiss, NRMP - Orissa


Orissa Agro climatic zones
Sheep & Goat population 2003
N
1 : 2,50,000
Sundargarh
Jharsuguda
Deogarh
Sambalpur
Keonjhar
Mayurbhanj
Balasore
Bargarh
Sonepur
Angul
Bhadrak
Bouth
Dhenkanal
Jajpur
Cuttack
Kendrapara
Nayagarh
Bolangir
Nuapara
Khurda
Puri
Jagatsinghpur
Kandhamal
Phulbani
Nowrangpur
Ganjam
Rayagada
Koraput
Gajapati
Malkangiri
SHEEP
Male
Female
GOAT


Districtwise distribution of Goat
and BPL status of Orissa
N
1 : 2,50,000
Goat
500,000
250,000
50,000
Male
Female
BPL status as on 2002
< 60 (8)
60 to 70 (10)
> 70 (12)
Indo-Swiss, NRMP-Orissa


Districtwise distribution of Sheep
and BPL status of Orissa
N
1 : 2,50,000
Sheep
500.000
250.000
50.000
Male
Female
BPL status as on 2002
< 60 (8)
60 to 70 (10)
> 70 (12)
Indo-Swiss, NRMP-Orissa


BPL status of ST population of Orissa
N
1 : 2,50,000
Balasore
Bhadrak
Jajpur
Dhenkanal
Kendrapara
Cuttack
Jagatsinghpur
Puri
Khurda
Ganjam
Nayagarh
Angul
Boudh
Sonepur
Bargarh
Bolangir
Nuapada
Kalahandi
Nabarangpur
Koraput
Malkangiri
Rayagada
Gajapati
Ganjam
Indo-Swiss, NRMP - Orissa
BPL status of Tribal

REFERENCES :

Acharya, R.M. (1982). Sheep and Goat breeds of India. FAO Animal Production and Health Papers 30, Food and Agricultural Organisation of the United Nations, Rome.

Acharya, R.M. and Singh, N. P. (1992). The Role of goats in conservation of Ecology and Livelihood security. Proceedings of V International Conference on goat, New Delhi, pp.81-99.

Bhat, P. N., Bhat, P.P., Khan, B.U., Goswami, O. B. and Singh, B. (1981). Animal Genetic Resources in India. I.V.R.I., Izat Nagar-243122, UP., India.

Bhattacharya, N. K. and Sahani, K. L. (1978). Goats of Orissa and Recommendations for their improvement, I.V.R.I., Izat Nagar-243122, UP., India.

Devendra, C. and McLeRoy (1982). Goat and Sheep production in the tropics. Longman Scientific & Technical, Longman Group UK Ltd., Longman House, Burnt Mill, Harlow, Essex CM20 2JE, England.

District Profile 1995-96. Directorate of Animal Husbandry & Veterinary Services, Orissa, Cuttack.

FAO (1999). The Global Strategy for the management of Farm Animal Genetic Resources. Executive Brief, Food and Agricultural organization of United Nations, Rome

Khan, B. U. and Rai, B. (2002). Goat Breeds of India, CSWRI, Avikanagar, 304501, India. Kornel, D (2002).

Kornel, D. (1999,a) Livestock and Poultry Genetic Resources in Orissa , Vol.I. Modern Book Depot, Bhubaneswar.

Kornel, D. (1999,b) Livestock and Poultry dynamic in Tribal Life, Koraput, Modern Book Depot, Bhubaneswar.

Kornel, D. (2004). Kuzi Sheep and Erka Sheep. Prolific sheep breeds of Orissa, pp.193-199. Biodiversity of Livestock in Orissa and its Role. Papers, proceedings and presentations of the workshop held in Bhubaneswar, India, on 6th and 7th February, 2004.

Kornel, D. (2004). Review of Biodiversity of Livestock in Orissa, pp.95-112. Biodiversity of Livestock in Orissa and its Role. Papers, proceedings and presentations of the workshop held in Bhubaneswar, India, on 6th and 7th February, 2004.

Kornel, D. (2006). Tribal Crop-Livestock Systems in South-East India. Manohar Publishers and Distributors, 4753/23 Ansari Road, Daryaganj, New Delhi-110002.

Kornel, D. (2006) Tribal Culture, Koya Tribal in Transition.

Kornel, D. and Mohapatra, S.C.(2006).Improvement of Livestock Breeds and its impact on disaster prone smallholder farmers. Proc. Int. Conf. on Livestock service, 17-19 April, Beijing, China, pp.254-257.

Kornel, D., Mohapatra, S. C., Alhawat, S. P. S. and Tripathy, A. (2004) Edt. Biodiversity of Livestock in Orissa and its Role. Papers, proceedings and presentations of the workshop held in Bhubaneswar, India, on 6th and 7th February, 2004.

Kurup, M.P.G. (2003) Edt. Livestock in Orissa Socio-economic perspective. Indo-Swiss NRM Programme, Orissa,

Mishra, K. C. (1982). Inheritance of some body measurements and their relationship with body weights of Ganjam goats, M.V.Sc. Thesis, OUAT, Bhubaneswar, India.

Mishra, P. K. (1976). Study of Sex Ratio and inheritance of some body measurements in a flock of Ganjam goats. M.V.Sc. Thesis, OUAT, Bhubaneswar, India.

Mohanty, A. C. (1991). Breed Characteristics and Performance of Ganjam and Bolangir sheep, Ph. D. Thesis in Veterinary Science and Animal Husbandry (Animal Production), OUAT, Bhubaneswar.

Patro, B. N. and Rao, P.K. (2004). Indigenous goat resources of Orissa, pp.176-185. Kornel, D., Mohapatra, S. C., Allhawat, S. P. S. and Tripathy, A. (2004) Edt. Biodiversity of Livestock in Orissa and its Role. Papers, proceedings and presentations of the workshop held in Bhubaneswar, India, on 6th and 7th February, 2004.

Pattnaik, B. M. (1984). Study of the Characteristics and Performance of Bengal Goats in Orissa, M.V.Sc. Thesis (Animal Production), OUAT, Bhubaneswar.

Piper, I. R. and Bindon, B. M. (1982). Genetic segregation for fecundity in Booroola Merino sheep. In: Barton, R.A. and Smith, W.C. (*eds.*) *Proceedngs of the World Congress on Sheep and Beef Cattle Breeding 1: Technical.* The Dunmore Press, Palmerston North, NZ. Pp.395-400.

Project Coordinator's Report (2002-03). Network Project on sheep improvement, CSWRI, Avikanagar-304501, India.

Sahoo, B. (1985). Estimation of dressed weight of Black Bengal goats from different body measurement. M. Sc. Thesis (Agricultural Statistics), OUAT, Bhubaneswar.

Singh, R.N., Achrya, R.N. and Biswas, D.K. (1970). Acta. Agric. Scand. 20: 61-64.

Subrahmanyam, S. and Murthy, C.S. (2006). Economics of Small Ruminants, Pigs and Backyard Poultry Production in Orissa, Indo-Swiss Natural Resource Management Project, Orissa (Livestock Delivery System), Bhubaneswar under print.

Turner, H. N. (1996). Introduction, pp.1-2. In Fahmy, M.H. (Edt.). Prolific sheep, CAB International, Walling Ford, Oxon. OX10 8DE, UK.

ABOUT THE AUTHORS

Prof. R. M. Acharya

Prof. R. M. Acharya was the Deputy Director General of Animal Sciences, Indian Council of Agricultural Research (ICAR), Government of India.. He obtained his B.V.Sc. Degree from Punjab University in 1956, MS from Ohio State University in 1962 and Ph. D. from Iowa State University in 1966. He worked in various positions like Lecturer, Associate Professor, Professor and Head, Department of Animal Breeding, Punjab/Haryana Agriculture University, 1956-1970; Director, Cental Sheep and Wool Research Institute, ICAR from 1970-80; Professor of Eminence in Animal Genetics, ICAR, 1978-79 and Deputy Director General, ICAR, 1981-90. He was also the Member Secretary of ICAR Review Committee; Advisor, Animal Husbandry, Govt. of Iran and associate with FAO, UNDP, World Bank, IDRC, SDC in Planning, Monitoring and Evaluation of Research and Development Programmes in Animal Husbandry and related areas.

He was a Fellow of National Academy of Science, India; President, International Goat Association, Indian Society of Sheep and Goat Production and Utilization, World Poultry Science Association (Indian Branch), Animal Nutrition Society of India and Indian Association of Buffalo Development; Vice-President, Indian Association of Animal Production, Indian Society of Animal Genetics and Breeding, World Buffalo Trust; Member, American Society of Animal Science, American Dam, Science Association and International Biometrics Society.

He has guided many students for M.V.Sc. and Ph. D Degree in Animal Breeding and has published number of papers in National and International of repute in the area of Animal Breeding.

Das Kornel

Das Kornel was Director, Central Cattle Breeding Farm, Department of Animal Husbandry and Dairying, Ministry of Agriculture, Government of India till 1999. He obtained his M.V.Sc. Degree from OUAT, Bhubaneswar and was trained in Embryo Transfer Technology (Advances in Animal Reproduction) at University of Brisbane, Australia and Project Planning and Management at Hoenbekhus, Denmark. His subjects of specializations are Animal Genetics and Breeding, Embryo Transfer and IVF embryo technology, Rural development, Biodiversity and Natural Resources Management, Backyard Poultry Production and Livelihood. He was associated with an Australian team during inception years of Indo-Australian Sheep Breeding Farm, Hissar, Government of India, and initiated studies in Artificial Insemination of Exotic sheep. He also undertook studies in Infertility of rams and ewes due to heat stress and cross breeding of Australian Corriedales with Sonadi and Nali breeds of Rajasthan. He has wide experience in sheep and goat development in tribal villages of Orissa while working as Danida Advisor in Integrated

Livestock Development Project, Koraput from 1993 to 2002. He has published 40 papers in reputed National and International Journals and has published books in Livestock Development and Poor, Animal Biodiversity, Tribal Farming Systems and Anthropology. His lead publication 'Livestock and Poultry Genetic Resources in Orissa, Volume-1, has been widely appreciated.

He has 10 years of experience in Tribal area livelihood institutional development, HRM, Project Planning and Implementation, as Danida Adviser; and experience as Programme Coordinator, Indo Swiss Natural Resource Programme, Bhubaneswar, Orissa especially in policy development and implementation with Government sector.

S. C. Mohapatra

Prof. S. C. Mohapatra is the retired Director of Central Avian Research Institute, ICAR, Izatnagar. He obtained his B.V.Sc. and A.H. degree from Utkal University in 1960 and M.S. and Ph. D. Degrees from Virginia Polytechnic Institute and State University, USA in 1966 and 1968 respectively. His specialization is in the field of Animal Breeding and Genetics. During his professional career spanning over a period of 36 years he worked in various capacities like poultry breeder and Professor of Poultry Science at IVRI, Izatnagar; Project Coordinator, All India Coordinated Research Project on Poultry Breeding, ICAR; Project Director, Project Directorate on Poultry and Director, Central Avian Research Institute, Izatnagar from which he superannuated in November 1996. He was the Editor of Indian Journal of Poultry Science from 1982 to 1988 and President, Indian Poultry Science Association from 1997 to 2002. As major Advisor he has guided 20 students for Masters Degree and 23 students for Ph. D. Degree. He has published more than 250 scientific papers in National and International journals of repute. He is the co-Author of a Book entitled "Poultry Production" published by the Indian Council of Agricultural Research. He has also written several Book Chapters and edited several Workshop and Symposia proceedings. In the recognition of his outstanding achievements in Academic Studies and Research he was presented the Graduate Award by Sigma Xi chapter of VPI in 1966. He is a fellow of National Academy of Veterinary Sciences, India and is the recipient of Hari Omm Trust Award of ICAR; VASVIK Award of VASK, Mumbai; Thakur Ram Avtar Singh Award and Indian Poultry Science Association award for his outstanding achievements in research in the area of Poultry Breeding and Genetics and development of high producing layer and broiler stocks and their commercialization.