

Potential Good Practice Note

Conservation of the Last Himalayan Cattle Breed of Bhutan



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Conservation of the Last Himalayan Cattle Breed of Bhutan

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Introduction

Eastern Himalayas, where Bhutan lies, has a diverse habitation of wild flora and fauna and is recognised as one of the 10 global hotspots for biodiversity conservation in the world (UNDP, 2002).

Bhutan is endowed with rich domestic animal biodiversity including yak, cattle, horses, sheep, goat, buffaloes, pigs and poultry. Of these species, *Nublang*, the indigenous cattle breed of Bhutan, is the most important genetic resources that support nearly 69% of Bhutanese Agriculture farming communities through provision of animal traction, manure and dairy products.

However, due to changes in the socio-economic environment, this unique indigenous cattle breed is under threat of extinction.



Despite environmental conservation occupying pivotal place in the country's development policies and strategies, initiatives for conservation of domestic animal biodiversity has been limited. A sustainable management plan for *Nublang* is, therefore, critical before it becomes totally extinct.

Nublang breeders are communities in remote areas where farmers are food insecure and live under extreme poverty. As such, interventions to improve productivity of this cattle breed shall directly contribute to increased rural livelihood and poverty alleviation. Further, as a signatory to Convention of Biological Diversity, Bhutan has an obligation to develop plans for sustainable management of native breeds and prevent the decline of biological diversity.

Definition

Nublang is the native cattle breed of Bhutan, with its original home tract in Haa Sangbeykha of Western Bhutan. The word *Nub* means west and *Lang* is a general term used to describe male cattle. The terminology, therefore, links its origin to the western part of the kingdom. Locally, the breeding bull is called as *Phalang*, *pha* indicating paternal lineage. There are also other terms like *Nub-lang*, *Tso-lang*, *Tha-lang*, *Chuk-lang*. The female counterpart of the breed is called as *Thrabum*.

Published literature on cattle breeds defines Bhutanese indigenous cattle as *Siri*. However, *Siri* is the broad terminology used to describe all local cattle types of the Himalayan belt. Recent genetic studies revealed genetic



Nublang (Male)



Thrabum (Female)

variation among Himalayan *Siri* cattle and supported uniqueness of the Bhutanese *Nublang/Thrabum*. *Nublang /Thrabum* have typical cervical hump of Zebu type, pendulous dewlap and long tail with thick switch touching the ground. Physical characteristics of *Nublang/Thrabum* in accordance with desirable / undesirable physical traits / breed standards are described in Table 1. In addition, those described in Table 1, the number of undesirable features has definitely increased over time mainly due to traditional cross breeding with *Mithun* and their back-crossing, the government's policy on sterilisation of scrub bulls, wherein even good quality *Nublang* bulls got castrated in the process of breed improvement and also the uncontrolled inbreeding which takes place.

Table 1: Farmers Breed Standards of <i>Nublang</i>		
Body Parts	Desirable	Not Desirable
Head	Long face, long hair on poll, base of horn and ear, horn directed outward, upward and forward	Short face, sparse hair, Horn directed sideward and backward
Neck	Short neck, well developed and pendulous dewlap	Long neck, short dewlap
Hump	Well developed with growth of thick long hair from its top	Small hump, less hair
General Body Conformation	Proportionate	Big head, thinner posterior part
Limbs	Strong, tall, rounded hooves	Weak, short, pointed hooves
Tail	Long, Hairy, Thick Switch	Short, thin with sparse hair on Switch
Sheath	Tight and big with abundant prepuce hair	Small sheath, sparse hair

Origin – History and Legend

Existence of *Nublang*, the native local breed of Bhutan, traces back as far as 1,000 years. (Dorji, 2005) The *Nublang* origin is linked with the legendary lake – *Nub Tshonapata*, located on the western mountain ranges of Haa, above Nakha village in Sangeykha geog. The legend, holding good over many generations, is that the first breeding bull was given to a cow herder as a return gift for his generosity in providing a night shelter and food to a troubled *Tshomen*¹ of *Nub Tshonapata*. The cow herder was thanked by the *Tshomen* who promised that he would be rewarded for his generosity with a bull. As promised, after few days of the departure of *Tshomen*, the cow herder saw a weak bull heading towards his herd. The herder took good care of the bull, which produced many offspring. Soon the *Nublang* breed became popular and widespread in the region. Thus, Sanbeykha geog came to be known for the best *Nublang* breed in the Kingdom.

¹ Mermaid or Water Spirit

***Nublang*: Genetically Unique Cattle Breed of Bhutan**

Nublang are stabilized breed that has evolved from crossing of humped cattle of Indian plains with that of humpless cattle migrated to southern slopes of Himalayas from Tibet. In eastern Nepal, Darjeeling and Sikkim in India, such cattle are called as *Kachcha Siri*, *Kachcha* meaning false. Comprehensive research on genetic diversity of Bhutanese *Nublang* with that of other cattle breeds in the region indicated genetic uniqueness of the breed. Bhutan is the original home tract of this cattle breed and substantial populations still exists. In India and Nepal, the cattle are already diluted with exotic breeds especially Jersey, Brown Swiss and Holstein Frisian.

This breed is localized to conditions in the sub-tropical zone although it is prevalent from alpine to lower sub-tropical areas. It migrates to higher areas during summer and low-lying zones (warmer zones) in winter. It is known that these animals like the deciduous vegetation and produce best in temperate climates.

Socio-economic role of *Nublang* / *Thrabum*

Nublang is the age old traditional breed where hybridization with *Mithun* has been well established. The hybrid population *Jatsa* and *Jatsham* were the back bone of Bhutanese farm economy through provision of draught power, dairy products and often serving as prestigious asset. Both *Nublang* and *Mithun* continue to support Bhutanese farming systems as a supplier of draught power, manure and milk products. A field study conducted in May 2005² by the Department of Livestock indicated that the average milk yield of a *Nublang* cow in a day is 3.5 litres from forest grazing alone without any concentrate feed.

The animal is most adapted to a wide range of agro-climatic conditions (Indigenous cattle follow migration and it migrates to higher areas during summer {2,800 masl} and low lying zones during winter {250 masl}), disease resistant, has good foraging abilities and survives under adverse nutritional conditions. Their multifaceted roles have made the breed the most suitable animal in the extensive to semi-intensive cattle production system in Bhutan. In addition, these indigenous breed are the main base population for cross breeding programme with exotic breeds (Jersey and Brown Swiss) thereby improving rural livelihoods.

Box 1: Production Performance of *Nublang*

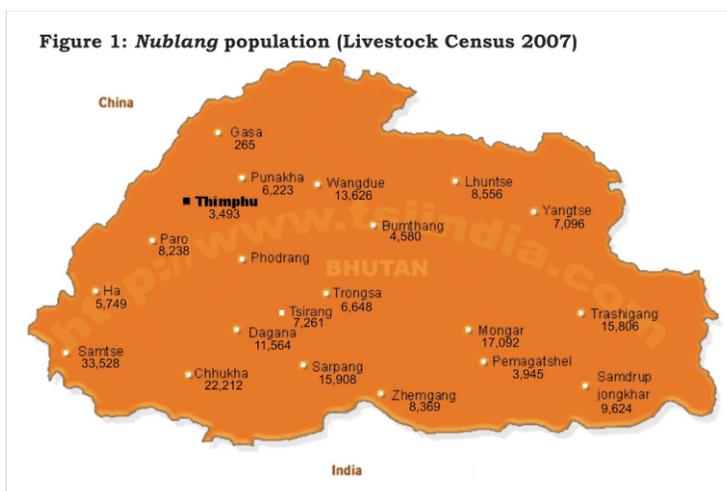
- * Average Age at first Mating: 43 months
- * Average Age at first Calving: 55 months
- * Average Calving Interval: 646 days
- * Average Gestation Period: 279 days
- * Average Lactation Length: 264 days
- * Average Lactation Yield (305 days): 465.6 litres
- * Average Fat%:4.35%

² Field Assessment Report: "Exploring potentials for *Nublang* Conservation and Breeding Programme at Haa Somboeykha", April – May 2005

Nublang Population Status in the Breeding Habitat

The present local cattle population in Bhutan is estimated at 208,783 (Livestock Census, DoL, 2007) spread over the districts as shown in Figure 1 (See Also Annexure 1).

However, this census does not reflect the true *Nublang* population because *Mithun* hybrids and back crosses are also included in the figure. Livestock experts are of the view that true *Nublang* resources may be less than 10% of the total compared to that reported in the census.



The recent survey of *Nublang* cattle in its breeding tract at Haa Sangbeykha recorded only 697 cattle (See Table 2). This was alarmingly low compared to more than 5,000 heads in the nineties indicating a drastic decline in the *Nublang* population.

Village	Young Male	Young Female	Heifer	Un-castrated*	Bull	Bullock	Milk	Dry
Shebji	14	20	32	14	7	7	15	15
Shaba	16	24	28	31	3	11	28	14
Cholingna	0	2	5	8	0	9	5	5
Gareykha	3	4	12	8	1	1	9	5
Somboey Ama	11	9	11	12	3	8	17	10
Nakaykha	16	8	16	7	1	11	16	2
Nakha	5	4	8	5	2	5	13	5
Trashigang	12	13	27	17	3	7	29	28

* Un-castrated includes both breeding bulls and young males

Threats to *Nublang* / *Thrabum* genetic resources

The *Nublang* breed has survived because of its utility in the traditional extensive mix crop livestock production system. However, production system is changing driven by economic needs which could pose serious threat to sustainability of the breed. The genetic improvement of livestock through distribution of exotic breeds (Jersey and Brown Swiss) and AI have been the main objectives of the 5 year plans of the Government for innumerable years, which has been detrimental to the conservation of the indigenous *Nublang* breed. Furthermore, the transition from an extensive or semi-intensive system (to which this breed is suited) to an intensive market oriented dairy farming which entails high yielding cattle breeds is contributing to the further genetic erosion of the breed.

Rationale for Sustainable Management of *Nublang* Genetic Resources

Animal genetic resources are global assets of inestimable value to human kind. As genetic diversity erodes our capacity to maintain and enhance livestock productivity and sustainable agriculture decreases, along with the ability to respond to changing conditions (FAO, 2000). The genetic diversity presently found in animal breeds allows farmers to select stock or develop new breeds in response to changes in the environment, threats of disease, changing market and social needs, all of which are largely unpredictable.

Nublang, the indigenous unique cattle breed of the Kingdom of Bhutan has been the baseline population for crossbreeding with *Mithun* (traditional crossbreeding) from time immemorial and with exotics breeds like Jersey and Brown Swiss from 1960's. Furthermore, crossbreeding *Nublang* with Jersey, Brown Swiss and *Mithun* to take advantage of the heterosis, has been increasingly advocated and aggressively pursued to increase productivity, and, hence, the income and livelihoods of rural farmers. With so much of emphasis on crossbreeding there has been gradual deterioration in the quality of *Nublang*. A sizeable number of *Nublang* cattle in peri-urban or areas with easy access and markets are already being substituted by improved breeds. The population of *Nublang* is, therefore, declining at an alarming rate.

It has also been observed that with the decline in the quality of *Nublang* there has been decline in the quality of crossbred animals produced. We also learn from the Indian context that indiscriminate cross breeding has in various situations led to lower instead of higher production. Thus, it is a common phenomenon that cross breeding was perceived as a solution, but nowadays for resource poor and tribal areas, selective breeding and up-gradation of indigenous breeds with same breeds in its breed tract for milch purpose and area specific breeds for draft purpose are promoted. The breed is, therefore, already endangered and a project proposal for conservation of *Nublang* has, hence, been prepared. To this end the Livestock Breeding Policy of Bhutan clearly states that in remote areas with no market access, the Government will encourage pure *Nublang* Breeding and cross breeding with *Mithun*.

In their paper on 'Characterisation of the *Siri*² breed and the *Mithun* cross *Siri* in Bhutan', Panchung & J.A. Roden³ undertook a survey with the aim to describe the evolution, morphological characteristics, body weights, body measurements and production performance of three indigenous cattle breeds in Bhutan, namely the *Siri*, *Mithun* cross *Siri* (*Jatsha* for male and *Jatsham* for female) and first backcross hybrids (*Yangku* for male and *Yangkum* for female). The aim of this breed description was to assist in developing the future conservation strategies of the indigenous breeds in Bhutan. In Bhutan, the *Mithun* bulls were imported to the west from the indigenous *Mithun* breeding regions. The presence of the *Mithun* in Bhutan is seen from the literature, as early as 1783 from the expedition account of Samuel Turner, as published by Simoons and Simoons in 1968 in their anthropological study of the *Mithun* keeping peoples. Ever since then, the *Mithun* has been used for crossbreeding with the indigenous *Siri* breed. Hickman and Tenzing (1982b) stated that the crossbreeding of the imported *Mithun* bulls with the indigenous *Siri* resulted in amazingly profitable hybrid offspring. Although the female hybrids are reproductively fertile, the male hybrids have not been used successfully to breed with the pure indigenous *Siri* as they are mostly sterile. The sterility of the male hybrids in *Mithun* cross European cattle, mostly *Bos taurus*, was reported by Kuhn in 1885 as quoted by Simoons and Simoons (1968) and Winter et al (1984). To overcome this male fertility problem, the Bhutanese herders practise backcrossing the female hybrids to *Siri* bulls for four generations. This type of breeding system has been established for at least a century. The hybrids of *Mithun* *Siri* crosses in each generation are phenotypically distinct and they have been given specific names. The male and female hybrids of *Mithun* *Siri* crosses are called

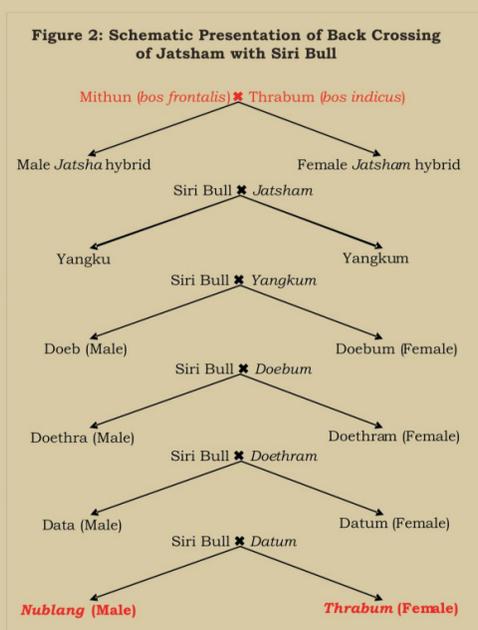
Jatsha and *Jatsham* respectively. The male offspring from the backcross in the first, second, third and fourth generations are known as *Yangku*, *Doeb*, *Data* and *Thrapa*, whereas, their corresponding females are called *Yangkum*, *Doebum*, *Datum* and *Thrabum*. The characterisation of livestock breeds is, therefore, paramount in order to exploit them in relation to selection and conservation.

Box 2:

There is one government farm with 179 heads of *Nublang* which was established in July 1994 under the advice of His Majesty the King. Two breeding farms with 109 and 94 heads of *Mithuns* respectively were established during the 4th five-year plan. The bulls from the *Nublang* farm are supplied to the farmers free of cost for improving the genetic stock of this breed at the field level. *Mithun* bulls are supplied at subsidised cost to the farmers for cross breeding with *Nublangs* for the highly priced F1 generation *Jatsam* and *Jatsa*. AI facilities with *Mithun* semen is also available free of cost to the farmers. The future direction of the conservation programme is geared towards upgrading the present farms to Open Nucleus Breeding Schemes with active participation of the farmers. The Traditional cross breeding with *Mithun* and *Siri* is illustrated in Figure 2.

The *Mithun* (*Bos frontalis*) locally known as *Bamey* is the domesticated form of *Gaur*. It is native to North eastern region of India. The use of *Mithun* for cross breeding is very common amongst cattle owners in Bhutan and dates back to as early as 17th Century. *Mithun* is mainly used to cross-breed with *Siri* to produce the F1 hybrids, *Jatsa* (male) and *Jatsam* (female). *Jatsa* are popular for draught power, while *Jatsam* are renowned for higher milk production and fat content. These animals are also robust and easy to manage in difficult terrain and have good foraging ability.

Source: FAO Country Report on the State of Animal genetic Resources in Bhutan, September 2002



² *Siri* refers to the indigenous *Nublang* cattle
³ Source: AGRI 1996
 20: 27 - 34

The basis for urgent interventions to halt the decline of *Nublang* includes:

- *It is the only traditional cattle breed indigenous to Bhutan. Its legendary origin in Bhutan is well established and agreed by the scientific community;
- *It is genetically unique and distinct to any other cattle in the neighbouring countries;
- *It has traditionally played significant role in the socio-economic, cultural and religious life of the Bhutanese society;
- *It is well adapted to survive and produce in harsh environment especially high rainfall areas, infested with blood sucking leeches and voracious flies;
- *It is indispensable to maintain sustainable farming systems in many parts of remote Bhutan
- *The breed has come under intense threat of dilution from hybridisation with *Mithun* and other introduced cattle breeds such as Jersey and Brown Swiss
- *Recognition of the animal by the State shall bestow it with legal ownership of the breed which in turn shall prevent claim/patent of the animal by other countries.
- *Bhutan is signatory to Convention of Biodiversity (CBD) which necessitates countries to conserve indigenous animal breeds
- *Bhutan's constitution mandates protection and conservation of its rich Biodiversity and it is one of the pillars of gross national happiness, the overarching Bhutanese development goals.

National Cattle identification and recording system has already been initiated in the breeding tract. Other initiatives that are ongoing for conservation of the *Nublang* are cryo-preservation in the gene bank and rearing of nucleus stock at the National *Nublang* Breeding Farm at Tashiyangphu.

Activities Planned

The sustainable management project of *Nublang* comprises five major components with three to ten defined activities under each component.

- i. Local institution building: Mobilize farmers to form *Nublang* Breeders Association
 - ☞ Project inception workshop of the stakeholders
 - ☞ Participatory development of association bylaws, rules and regulations
 - ☞ Formal registration of *Nublang* Breeders Association
 - ☞ Mobilise interest groups for creation of *Nublang* Trust Fund
- ii. In-situ Conservation Programme: Initiation of Participatory Field Breeding Scheme
 - ☞ Develop criteria and standards for *Nublang* herd book
 - ☞ Selection, Register & Identification of *Nublang* / *Thrabum*
 - ☞ Introduce herd recording system and initiation of *Nublang* herd book
 - ☞ Establish linkage between Field programme and Nucleus herd.
 - ☞ Field Assessment of *Nublang* in other potential dzongkhags
 - ☞ Information and communication networks
- iii. *Nublang* Marketing and Product diversification
 - ☞ Establish market support structure
 - ☞ Organize marketing events, publicity and promotion fairs
 - ☞ Facilitate association members to market their registered cattle
 - ☞ Diversify *Nublang* Products and Trade (eco-tours; organic dairy products; trained bullocks)

- iv. Ex-situ *Nublang* conservation Programme : Strengthen *Nublang* Nucleus Farm
 - ☞ Introduce embryo transfer technology
 - ☞ Establish bull rearing station
 - ☞ Cryo-preservation of semen and embryos

- v. Integrated Management of *Nublang* Grazing Resources
 - ☞ Integration of fodder trees with cardamom plantations
 - ☞ Establishment of fodder tree nursery and germplasm banks
 - ☞ Promotion of fodder grass and legumes as part of land management (hedge rows, inter-cropping)
 - ☞ Enrichment of crop by products / residues
 - ☞ Promotion of oil seeds programme (mustard) for mustard cake concentrate
 - ☞ Resource mapping, land lease and development
 - ☞ Develop nutritional standards for different categories of *Nublang* using locally available resources
 - ☞ Inventory and assessment of invasive alien plant species (eg. *Eupatorium* spp)

- vi. Capacity building of the members of *Nublang* Breeders Association and Staff
 - ☞ Awareness training on group formation
 - ☞ Study visits for association members and staff
 - ☞ Short term training on herd book, data collection, recording, analysis
 - ☞ Short term training on animal breeding and reproductive management
 - ☞ Short term training on embryo transfer technology

- vii. Institutional Arrangement and time frame. The main stakeholders involved in the implementation of the *Nublang* project include:
 - a) Department of Livestock;
 - b) National Biodiversity centre, Serbithang;
 - c) Dzongkhag Livestock Sector, Haa;
 - d) Livestock Extension Centre, Sangbeykha and Gakiling geog;
 - e) Sangbey Dungkhag;
 - f) National *Nublang* Breeding Farm, Tashi Yangphu,
 - g) National Livestock Breeding Programme, Wangchutaba and
 - h) Council for RNR Research of Bhutan

The lead institution shall be responsible for planning and implementation of the assigned component. NBC⁵ as the national body for coordinating conservation programmes shall take lead role in monitoring and final reporting of the programme. Basic field data collection has already been initiated. However, due to remoteness and inaccessibility, implementation of project activities needs longer time. Therefore, the first phase of the project is planned for 3 years (July 2009 to July 2012).

⁵ National Breeding Centre

Conclusion

Conservation of the bio-diversity and the nation's natural environment is essential for achieving the stated objective of gross domestic happiness as it impacts the quality of life in most spheres, for both the present and future generations.

Bhutan is endowed with rich animal bio-diversity of which, *Nublang*, the indigenous cattle breed of Bhutan is the most important as it supports nearly 69% of its farming operations in the traditional agriculture – livestock mix system. However, due to changes in the socio-economic environment there has been a decline in the genetic resource of this traditional Himalayan Breed.

Currently, there has been a shift in the breeding policy especially for resource poor households and tribal areas. Selective breeding and up-gradation of indigenous breeds is considered to be more appropriate for meeting their economic and draft purpose requirements, instead of pure crossbreds.

Nublang with its multiple uses is, therefore, an important cattle genetic resource. Further, *Nublang* has been and will continue to be a base population for crossbreeding with *Mithun* as well as exotic crosses. Decline in the quality of *Nublang* has had negative impacts on the quality of cross bred animals also. Thus, availability of good quality *Nublang* gives opportunities for farmers to select stock or crossbreed in response to changing socio-economic environment. Thus the breed needs to be conserved for sustainable utilisation in the near future. However, successful conservation programmes require many years of sustained effort to have an effect. Bhutan's Ministry of Agriculture, therefore, needs to prepare effective plans and make resources readily available for it. It is hoped that the planned project (illustrated above) shows the path and goes a long way in successful conservation of the *Nublang* cattle breed.

The Royal Government of Bhutan perceives conservation of AnGR⁶ as a national priority; its importance is also being felt by the general population. The concern can best be epitomised by the words spoken by His Majesty Jigme Singye Wangchuck who stated that *“throughout the centuries the Bhutanese have treasured their natural environment and have looked upon it as the source of all life. This traditional reverence for nature has delivered us into the twentieth century with our environment still richly intact. We wish to continue living in harmony with nature and to pass on this rich heritage to our future generations”*.

Annexure 1: Nublang by Various Category 2007

Dzongkhag (District)	Young		Heifer	Milch	Dry	Breeding Bull	Bullocks	Total
	Male	Female						
Bumthang	569	457	666	807	954	31	1,096	4,580
Chhukha	2,297	4,777	3,078	4,166	3,190	78	4,626	22,212
Dagana	1,345	1,269	1,791	1,667	1,720	226	3,546	11,564
Gasa	1	3	47	33	55	2	124	265
Ha	636	1,124	753	1,339	1,077	81	739	5,749
Lhuentse	1,240	1,032	1,529	1,605	1,918	89	1,143	8,556
Mongar	2,361	1,863	3,051	3,213	3,166	344	3,094	17,092
Paro	967	918	1,008	1,484	1,865	160	1,836	8,238
Pemagatshel	445	432	719	692	778	16	863	3,945
Punakha	571	721	980	980	1,020	299	1,652	6,223
Samdrupjong khar	1,228	869	1,551	1,854	1,728	136	2,258	9,624
Samtse	5,336	5,557	5,484	4,983	4,236	3,378	4,554	33,528
Sarpang	1,820	1,228	2,678	2,991	2,728	45	4,418	15,908
Thimphu	449	479	495	653	595	110	712	3,493
Trashigang	1,963	2,119	2,727	3,225	3,474	260	2,038	15,806
Trashi Yangtse	732	985	1,195	1,599	1,490	35	1,060	7,096
Trongsa	558	530	650	1,020	1,259	55	1,576	5,648
Tsirang	614	629	1,046	878	856	86	3,152	7,261
Wangdue	1,386	1,457	2,207	2,625	2,495	597	2,859	13,626
Zhemgang	1,036	909	1,308	1,600	1,584	160	1,772	8,369
Total	25,554	27,358	32,963	37,414	36,188	6,188	43,118	208,783
<i>Source: Livestock Census, Department of Livestock, 2007</i>								

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The NDDB-FAO **South Asia Pro-Poor Livestock Policy Programme** (SA-PPLPP) SA PPLPP is a unique livestock development program that aims to 'to ensure that the interests of poor livestock keepers are reflected in national as well as international policies and programs affecting their livelihoods'. It endeavors to do so by a) creating spaces for and facilitating dialogue among the actors playing a direct and indirect role in the livestock sector of South Asia, and b) drawing from and using lessons from field experiences to influence livestock-related policies, programmatic and institutional changes towards the benefit of poor fe/male livestock keepers in the region.

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Department of Livestock, Ministry of Agriculture, Royal Government of Bhutan: Livestock rearing forms an integral part of the Bhutanese farming system in integration with crop production (provides draught power, farm yard manure) and forest (means of collecting, concentrating and breaking down large amounts of plant materials) and producing milk, butter, cheese, meat, eggs and pack animals in the higher altitude areas. Cattle are by far the most important livestock as over 90% of the households own them. Bhutan's policy of self-reliance aims at achieving self-sufficiency in livestock and livestock products. Depending upon the geographic location, livestock represents a major or minor proportion of farmers' income. The livestock production system therefore is seldom regarded as a distinct enterprise. In order to meet the government objective of self-sufficiency in livestock production, the Government, under the Department of Livestock has established various programmes which produce inputs for distribution (and sales) to farmers for livestock and agriculture development. The programmes also include animal health coverage and maintenance services on agriculture machinery.

For more information on the Department of Livestock, kindly visit their website at http://www.moa.gov.bt/moa/agency/agprofile_detail.php?id=3&agname=Department+of+Livestock

About this Potential Good Practice Note

This note elaborates upon the indigenous cattle breed of Bhutan - *Nublang*, its origin, the threats to this unique genetic resource and illustrates the conservation programme planned by the Royal Government of Bhutan.

SOUTH ASIA Pro Poor Livestock Policy Programme

A joint initiative of NDDDB and FAO

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