

WELCOME



National Research Centre on Yak
(Indian Council of Agricultural Research)
Dirang – 790 101, Arunachal Pradesh



Proliferation of Hybridization Practice between Yak and Cattle:

A way Forward for Yak Herders of Climate Sensitive Arunachal Pradesh!?

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Preface...

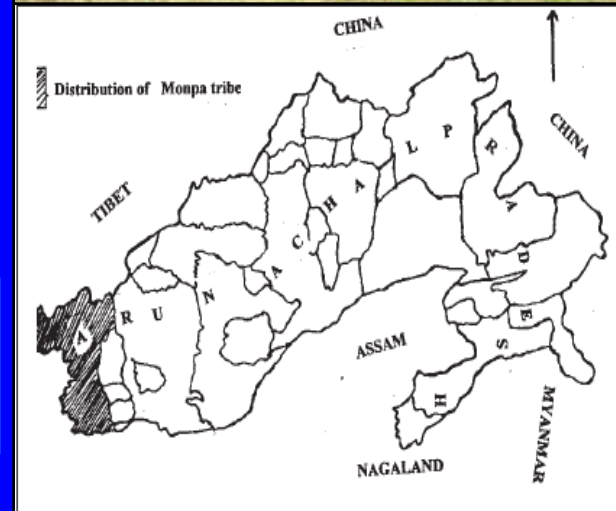
Yak (*Poephagus grunniens* L)

Habitat: High altitudes of Asian mountains (3000 m to 6000 m MSL) at Tibetan plateau and adjoining regions of Himalayas

Socio-economic importance of yak for highlanders is tremendous as it provides:

- Milk
- Meat
- Hair/wool
- Transport & draught

Provide 62 % of livelihood requirement of highlanders of Arunachal Pradesh





Bisonaian Yak



Common Yak

**T
Y
P
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S

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F

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A
K**



Hairy Forehead Yak



White Yak

Yak-Cattle Hybrid



Galang (Tibetan Hill Cattle)

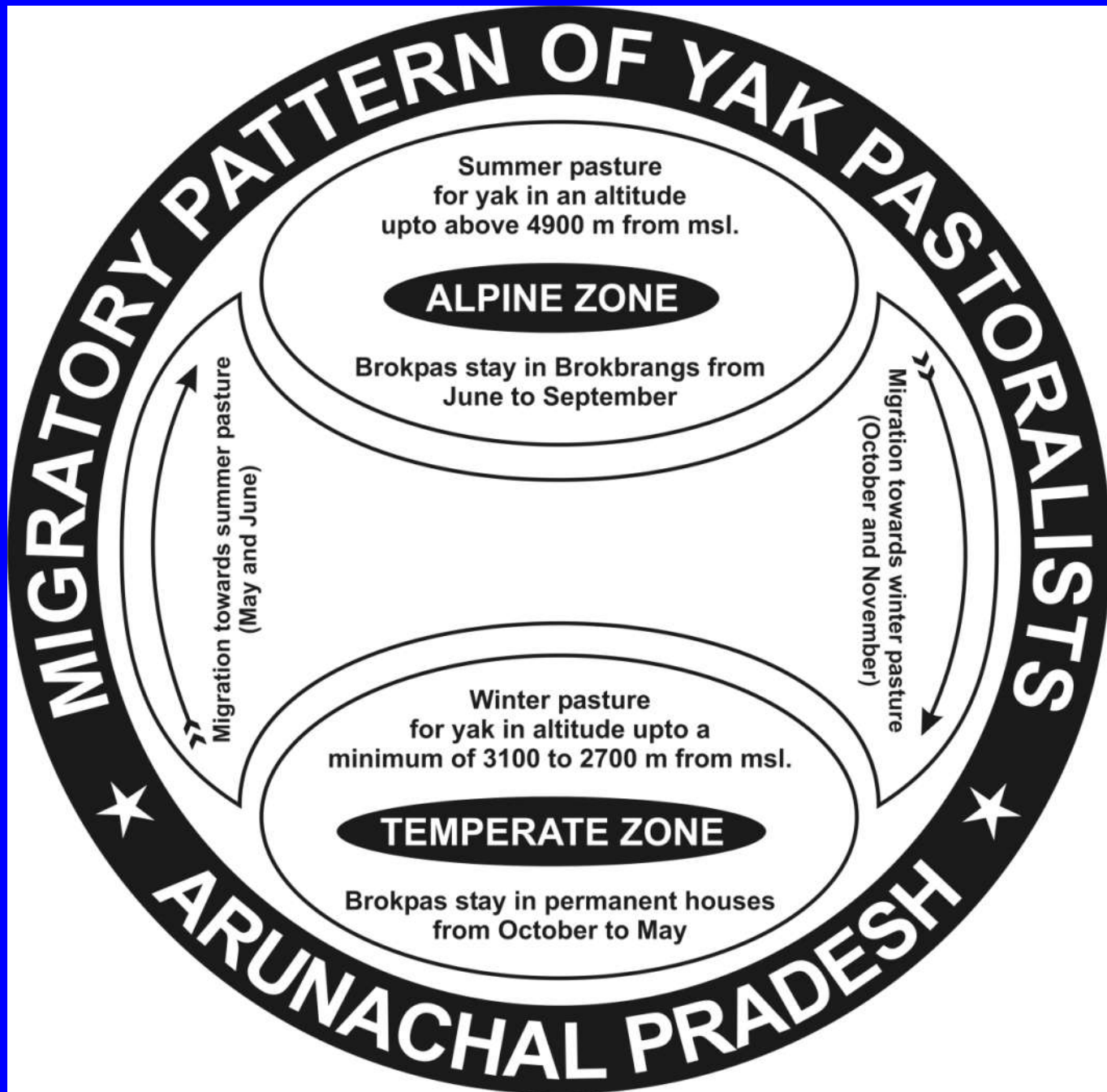


Brown Yak



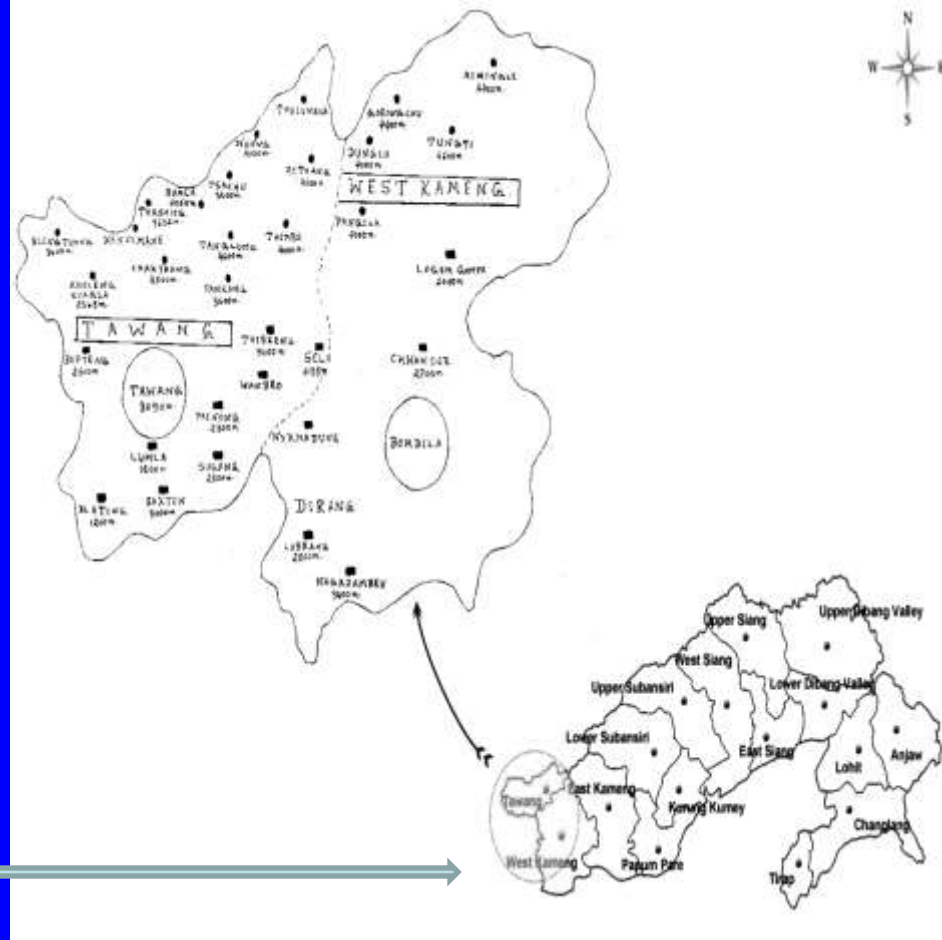
Yak Herders





Locale of the study

West Kameng and Tawang District of Arunachal Pradesh



240 livestock rearers from 12 villages of West Kameng and Tawang district

Temperature relative humidity along with temperature humidity index of West Kameng district, Arunachal Pradesh

(Mean \pm SE)

Month	Air temperature (°C)	Relative humidity (%)	Temperature humidity (THI*)
January	3.40 \pm 0.34	76.33 \pm 1.96	40.84
February	5.11 \pm 0.23	77.52 \pm 2.98	43.32
March	6.80 \pm 0.39	77.67 \pm 2.88	45.99
April	9.80 \pm 0.36	78.63 \pm 1.47	50.68
May	11.57 \pm 0.20	88.81 \pm 1.00	53.23
June	13.79 \pm 0.20	94.27 \pm 0.57	56.95
July	14.05 \pm 0.100	93.16 \pm 1.30	57.41
August	14.79 \pm 0.20	83.63 \pm 2.56	58.64
September	13.26 \pm 0.14	80.88 \pm 3.39	56.43
October	10.42 \pm 0.40	88.97 \pm 1.05	51.29
November	6.52 \pm 0.28	80.90 \pm 1.71	45.32
December	3.14 \pm 0.18	71.27 \pm 2.20	40.99

(Source: NRC on Yak, Dirang)

Climatic scenario in yak rearing districts of Arunachal Pradesh

Climatic Variables	Tawang	West Kameng
Numbers of years having 20 percent excess rainy days than normal during 1975 to 2004	3	5
Numbers of years having excess rainfall during 1975 to 2004	7	6
Numbers of years having moderate metrological drought during 1975 to 2004	4	4
Variation in rainfall during 1975 to 2004 (%)	28.9	28.5
Numbers of days having very heavy rainfall during 1975 to 2004	21	15
Numbers of heat wave incidences during 1975 to 2004	17	23
Numbers of cold wave incidences during 1975 to 2004	7	8
Change in mean temperature from 1975 to 2004 (°C)	1.042	1.152
Change in mean maximum temperature from 1975 to 2004 (°C)	0.26	1.09
Change in mean minimum temperature from 1975 to 2004 (°C)	1.196	1.315

(Source: IMD, Pune)

Adaptation strategies followed by the yak herders of Arunachal Pradesh

Sl No	Adaptation Strategies	F	C	D	NF
1	Proliferation of yak-cattle hybridization	53.38	41.22	12.16	46.62
2	Migrate to higher altitude	64.86	54.73	10.14	35.14
3	Duration of migration has expanded by 2-3 months	100	83.11	16.89	00.00
4	Change in timing of migration	60.81	60.81	0.00	39.19
5	Herd diversification	52.03	25.00	27.03	47.97
6	Change in pasture utilization practice	100	3.65	26.35	0.00
7	Rejuvenation of degraded high altitude pastures	0.81	48.65	12.16	39.19
8	Feed supplementation	90.54	67.57	22.97	9.46
9	Healthcare practices	0.81	47.30	13.51	39.19
10	Searching of alternate sources income	64.19	4.19	00.00	35.81

F – Followed; C – Continued; D – Discontinued; NF – Never Followed;

Values indicate percentage row wise

Hybridization Practice between Yak and Cattle

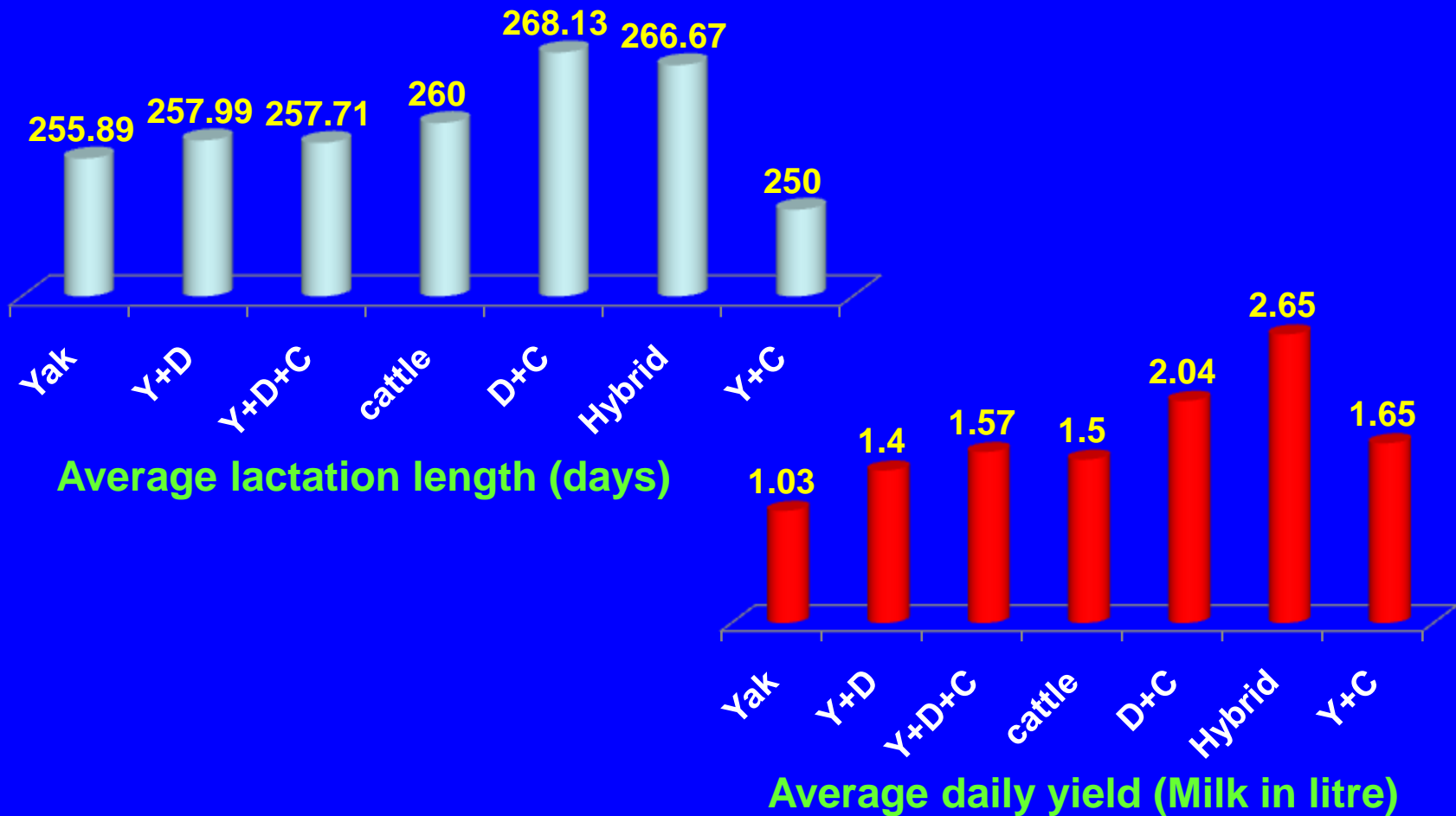
Sl. No	Parents used in crossing		Produced Offspring	
	Female	Male	Female	Male
1	<i>Kot (Hill cattle)</i>	Yak	<i>Dzomo</i>	<i>Zo</i>
2	<i>Dzomo</i>	Yak	<i>Tui Dama</i>	<i>Tui Shang</i>
3	<i>Tui Dama</i>	Yak	<i>Garmu</i>	<i>Garyak</i>
4	<i>Garmu</i>	Yak	<i>Kyukmu</i>	<i>Kyukyak</i>
5	<i>Kyukmu</i>	Yak	<i>Yak</i>	<i>Yak</i>
6	Yak	<i>Galang</i>	<i>Brim Dzomo</i>	<i>Brim Zo</i>

Why adopt hybridization practices???

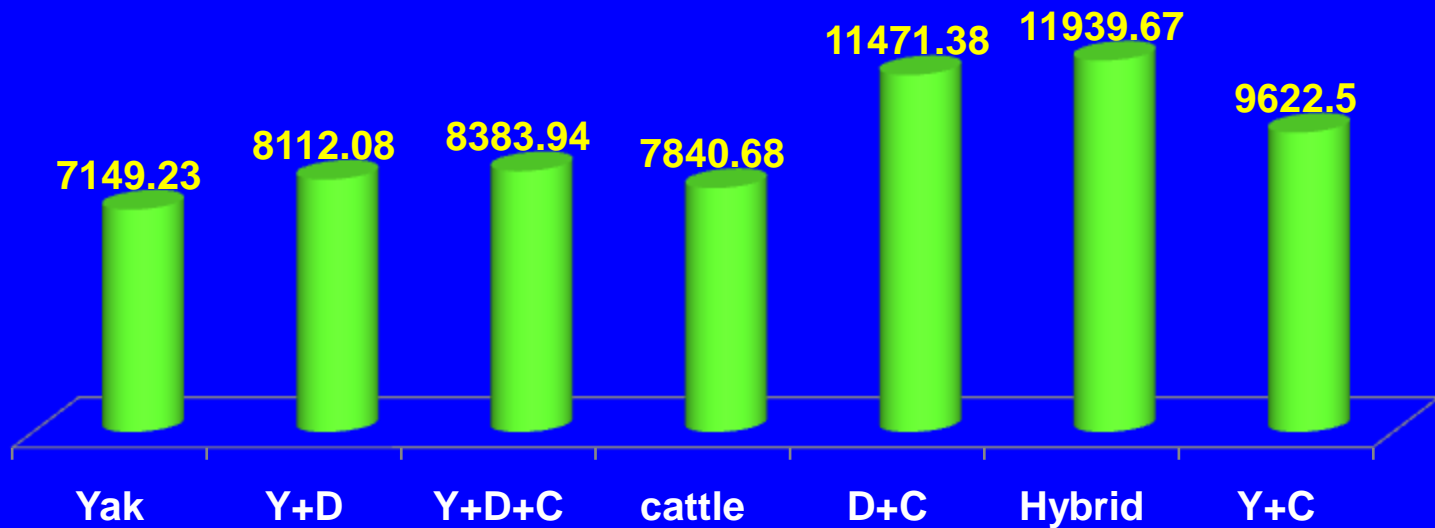
1. F_1 hybrid have better milk yield (25 %), higher meat production (22 %) and better draughtability.
2. Better conception rate
3. Hybrid adapt better to the intermediate zone between cattle and yak habitat



Production performance under traditional rearing system



Yak – only yak; Y+D – Yak and Hybrid; Y+D+C – Yak, Hybrid and cattle; D+C – Hybrid and Cattle; Hybrid – Yak Cattle Hybrid; Y+C – Yak and Cattle



Average lactation yield per herd (milk in litre)

Yak – only yak; Y+D – Yak and Hybrid; Y+D+C – Yak, Hybrid and cattle;
D+C – Hybrid and Cattle; Hybrid – Yak Cattle Hybrid; Y+C – Yak and Cattle

Benefit-Cost (B-C) Ratio of the yak based livestock production system of Arunachal Pradesh

(Mean \pm SE)
(Rupees)

	Fixed cost	Variable cost	Total cost	Gross return	Net return	Benefit-Cost Ratio
Yak	3414 \pm 281	56410 \pm 4339	59824 \pm 4525	251302 \pm 19623	191479 \pm 16822	4.34 \pm 0.24
Y+D	3978 \pm 681	51905 \pm 2623	55884 \pm 2944	292876 \pm 19982	236992 \pm 18606	5.37 \pm 0.29
Y+D+C	3409 \pm 132	54229 \pm 5163	57638 \pm 5221	124993 \pm 11966	67354 \pm 6750	2.16 \pm 0.01
Cattle	2668 \pm 187	62245 \pm 1629	64913 \pm 1586	216622 \pm 20905	151709 \pm 21577	3.37 \pm 0.38
D+C	2895 \pm 315	83956 \pm 6185	86851 \pm 6231	331984 \pm 96900	245134 \pm 93070	3.73 \pm 0.88
Hybrid	3103 \pm 452	66658 \pm 28887	69672 \pm 29335	420292 \pm 187425	350530 \pm 158123	5.90 \pm 0.26
Y+C	2520 \pm 350	49010 \pm 7080	51530 \pm 7430	264338 \pm 137013	212807 \pm 129582	4.85 \pm 1.96

Yak – only yak; Y+D – Yak and Hybrid; Y+D+C – Yak, Hybrid and cattle; D+C – Hybrid and Cattle; Hybrid – Yak Cattle Hybrid; Y+C – Yak and Cattle

Concerns....

Should proliferation of yak cattle hybridization be encouraged???

Eriksen et al. (2011) argued that every response to the climate change by the farmers is not always good one.

Yak population as per 18th Census in Arunachal Pradesh:

District	Yak	Yak-Cattle Hybrid
Arunachal Pradesh	5975	8256
•Tawang	4258	5764
•West Kameng	1717	2492

Though it is profitable but should not be encouraged. Yak presently a threatened species. If hybridization is encouraged, then, in coming future yak will be endangered species and may be disappear from meadows of the Himalaya.

THANK YOU

