ICAR- National Research Centre on yak

Dirang - 790101, Arunachal Pradesh

An ISO 9001:2015 Certified Institute

VERY SPECIFIC AND TECHNOLOGICALLY VALIDATED OUTPUT/ OUTCOMES

1. COMPLETE FEED BLOCK (CFB) TECHNOLOGY:

1. Feed and fodder scarcity especially during winter is one of the biggest hindrance in sustainable livestock production at high mountain areas. Yaks looses up to 25% of their body weight due to scarce of feed/fodder availability, hence the productivity of milk also affected which may comes almost nil.
2. Conserved feed in the form of complete feed block is an efficient management option to supplement feeds besides traditional grazing to ensure optimum production and management of the highlander animals during winter.
3. The Complete Feed Block Technology is the latest development of feed technology to exploit the potentiality of locally available animal feed resources besides using non-conventional feed resources in a better way that makes livestock farming an economically viable enterprise. Complete feed block (CFB) is an intimate mixture of processed ingredients including roughages and concentrates designed as the sole source of feed in compressed form.
4. All the processed feed ingredients inclusive of roughages and concentrates are mixed in a uniform blend and compressed at high pressure, ensuring the supply of diet of same composition. Depending upon the physiological need of the animals their compositions may varied starting at Roughage :Concentrate = 60 :40 level with possibility to incorporate up to 30% of tree leaves and molasses at the rate of 3-10% for proper binding and maintaining palatability.
5. ICAR-NRC on Yak recorded beneficial effects in preventing the loss of body weights and milk yields due to winter feed crisis in growing and lactating yaks under field condition from their experiments conducted at Manadala situated at a height of 10000ft msl. Disseminating the technology through awareness cum training programmes, publishing leaflets, folders and training manuals are undertaken by this institute time to time for the yak rearersand stakeholders. A total of **22,000***Complete Feed Blocks,*made from locally available feed resources to combat winter feed crisis of the yaks, has been distributed and carried field trials at farmers' door to demonstrate recouping 25-30% of body weight of yaks during winter..

Preparation of CFB

Paddy straw based CFB

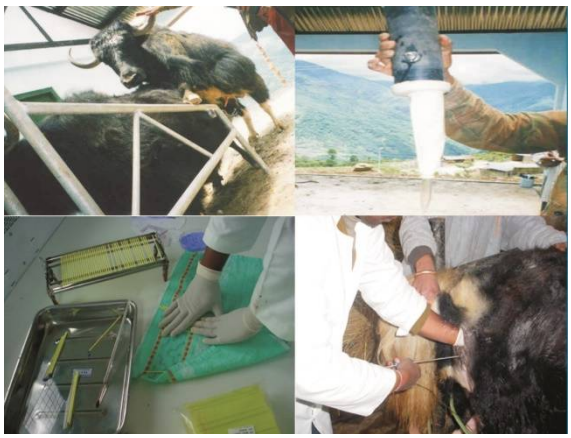
CFB feeding to yaks

CFB with lady farmersPortable

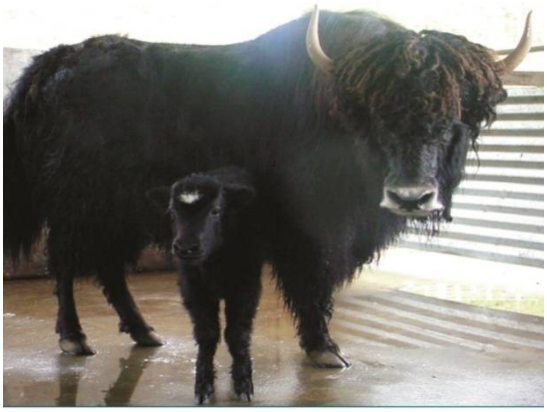
CFB machine demonstration

2. ARTIFICIAL INSEMINATION (A.I.) WITH FROZEN SEMEN TECHNOLOGY

- Artificial insemination (A.I.) is the most important and unique technique devised for the genetic improvement of animals, because by this method only few superior males produce enough sperms to inseminate thousands of females per year.
- Apart from genetic improvement, application of the technology helps reducing inbreeding within a herd of yaks.
- Artificial insemination is the process by which semen is collected from superior bulls, processed, stored and thawed to deposit in the genital tract of a female displaying estrus. There are many steps involved in the artificial insemination programme, which include selection of superior bulls, semen collection, semen processing, cryopreservation (at -196^0 C in liquid nitrogen), thawing and insemination.
- With first yak calf born through A.I. on 7th July, 2006 at Nyukmadung farm of ICAR-NRC on Yak.. the use of the technology has shown65% conception rate with production of more than 100 elite calves so far.
- This technology has been propagated and 800 frozen yak semen straws were distributed to AH Departments of Arunachal Pradesh, Sikkim and J&K for use to upgrade their yaks and reduce inbreeding.
- It is targeted to produce one million doses of frozen semen straws to complete AI coverage in yak in the country under vision – 2050 of ICAR-NRC on Yak.



Semen collection, processing & A.I.



First A.I. born yak calf with its mother

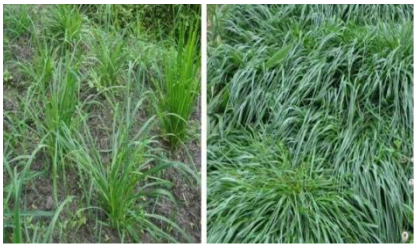
VISIBLE AND IMPLEMENTABLE ACHIEVEMENTS

1. **Yak milk whey beverages incorporated with Kiwi fruit pulp:**
   Beverages from yak milk whey were fortified to produce health drinks which can be developed as entrepreneurship. More than 250 farmers/ rural youths were trained and the sale price of the product is shown as Rs. 20/- per 200 ml pack.

2. **Area specific mineral mixture (ASMM):**
   Based on the survey Soil, feed and fodder of yak rearing regions ASMM has been developed which helps in improving reproductive efficiency of yaks and can be exploited commercially. More than 150 farmers/ rural youths have been trained and the sale price is`120/- per kg.

3. **Functional paneer from yak milk:**
   Yak milkhaving as high fat content (8.5%) which is not good for cardiac patients/ old people. However, paneer made from low fat is very hard which was fortified with fibre to have health benefits and this technology has also had commercial value. More than 80 ruralwomen have been trained and the sale price isRs350/- per kg with a B:C ratioof 3.9.

4. **Establishment and rejuvenation of highland pastures:**
   Pasture biomass enhanced from 100.14 q/ha (2cuts) to 519.90 q/ha (3cuts) by establishing rejuvenation of alpine pasture with suitable grasses. Traditional pasture can support 10 yak units per hectare for three months whereas this technology supports 50 yak units. The B:C ratio is 5.1 and the net annual income is Rs.4, 10,000/-.



DactylisglomerataLoliumperenne

Dactylisglomerata
Yield 250-300qt./ha

Salix plantation at tree trunk

5. **Embryo Transfer Technology (ETT) and *In-vitro* Fertilization:**
   Embryo Transfer Technology (ETT) and *in-vitro* Fertilizationresulted in first calves produced in the world which were demonstrated to stakeholders/ developmental agencies for its use towards faster multiplication of superior yak germplasm.The protocol for production of embryo through *in-vitro* fertilization (IVF) of octytes retrieved with ultrasound guided ovum pickup (OPU) technique in yak is a significant development towards conservation and multiplication of elite yaks in the country.

Mishmo the first ETT Yak calf

Norgyal first IVF calf

6. Yak fibre and value addition:

- *Hand knotted yak coarse hair carpets/wall hangings and foot mats.*
  Carpets/Wall hangings and foot mats are prepared from coarse yak hair fibre with beautiful designs by hand knotted method.**Cost** :Rs. 350/-/Sq.ft

- *Yak Jute Blended Fabric and Garments*
  Yak Jute blended Fabric cloths are prepared from coarse yak hair fibre blended with Jute and cotton (40:40:20) with beautiful computer designs and made in newly installed Fabric machinery. This commercially viable blended yarn of jute and yak wool can be used for different product like Man Over coat, Table liner, Man Jacket, Man half Jacket, Women half Jacket and man over coat. This technology has overwhelmed acceptance among local farmers. Cost benefit ratio of yak can be enhanced up to 1000 fold by blended fabric production with jute.

- *Yak Jute blended Fabric*
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- *Man Over coat*
  Full size man over coat made up by Yak Jute blended Fabric (50:50).
  Cost :Rs. 3000/- per piece

- *Table liner*

Table liner in Yak, Jute and Cotton blended Fabric (40:40:20).**Cost** :Rs. 300/- per meter

- *Man Jacket*
  Details of Technology: Man Jacket made up by Yak Jute blended Fabric (50:50). **Cost** :Rs. 2500/- per piece

- *Man half Jacket*

  Man half Jacket made up by Yak Jute blended Fabric (50:50).

  Cost :Rs 1500/- per piece

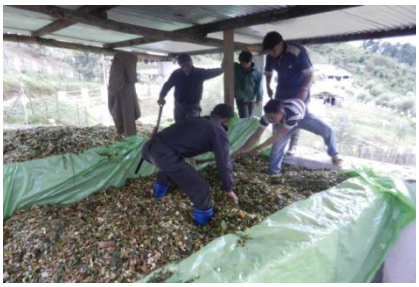
- *Women half Jacket*

  Details of Technology: Women Half Jacket made up by Yak Jute blended Fabric (50:50). **Cost** : ` 1500/- per piece

7. **Ag-Machinery - Portable CFB Making Machine:**

After getting accomplishments of CFBs from different parts of the yak rearing areas, to make CFB making machine affordable and portable this institute in collaboration with the IIT, Guwahati produces Manual VFB Making machines costing only Rs. 12000/-. Five numbers of such machines were distributed to four different villages of West Kameng and Tawang district under TSP fund of the institute andfarmers of six villages were benefitted.

8. **Conservation of forages:**



Conservation of forages(ensiling) for high altitudes has been demonstrated to the farmers and some of them have adopted which helped them to fight winter feed crisis.

9. **Herbal Leech Repellant developed:**

Herbal Leech Repellant developedhas helped efficient and cost-effective protection against leech infestation, a common menace, and the farmers are made aware of the effectiveness of using this plant extract during different training and awareness program.

10. **Package and Practices:**

Package and Practiceson yak health care and management, amelioration of highland pasture, and management of yaks for packability are given to various stakeholders for overall improvement of yak husbandry in the country.