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CURRENT TRENDS AND SUSTAINABLE UTILIZATION OF CAMEL

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With increased mechanization and change in lifestyle, the draught species of the livestock are facing severe decline in their population. The Camel, an integral part of desert eco-system, is facing severe challenges for sustenance. Under changed circumstances, the utilization of its draught power is reducing but its use in eco-tourism is increasing significantly. Additionally, it is being used for the production of milk in southern Rajasthan. The population of camel in India is 4 lakhs and it has gone down by 22.55% during the year 2007 to 2012 (Livestock Census 2012). The dwindling camel population in the country is a matter of major concern for the conservation biologist, policy makers and the state governments. The population of double humped camel has increased from 141 (Livestock Census 2012) to 214 (Livestock Census 2012) chiefly because of tourism. The world scenario reveals that the people across the globe are very versatile and they make use of its race, milk and meat production potential apart from the draught and baggage transport. The world has 27.73 m camels spread across 48 countries. About 85% of the camel population inhabits mainly eastern and northern Africa and rest in Indian subcontinent and Middle East countries. Of the 48 camel rearing countries, 29 produces milk to the tune of 2.9 m tonnes per annum and 36 produces 0.53 m tonnes of meat per annum. Looking at the country wise statistics 27 countries produce both milk and meat and 10 countries produce only meat. Ukraine and Qatar produces only milk. Nine countries, including India, have neither been listed as milk nor meat producing countries. However, a study conducted at the Centre indicated that at present in the state of Rajasthan and Gujarat camel milk is being sold in the market. As well, there are reports of smuggling of camel for slaughter. This clearly indicates that apart from the traditional use of camel as a draught species, it is being used at present as a producer of milk, meat or both. It is reported that the camel meat and milk are the two chief sources of animal protein to the weaker section of the world human populations. However, race and meat production potential do not have that much importance in this country but the milk production potential and eco-tourism has emerged as a tool to sustain the species *in situ*.

India has four major breeds of camel viz. Bikaneri, Jaisalmeri, Kachchhi and Mewari. Few animals of Sindhi camel are also seen around the bordering area with Sindh, Pakistan. The camels of Bikaneri breed are heavily built and are attractive with a noble look. It is a multipurpose breed. Jaisalmeri camels are gracious, lightly built and well known for riding and race potential. The Kachchhi breed is a multipurpose breed and the females are good milk producers. Mewari camels are stouter and well adapted to travel and carry loads across hills. They are exclusively used for milk production. Sindhi camels are classified as baggage type and have the ability to carry loads in marshy land. The double humped Ladakhi camels are used as baggage animals for short distance transport of various items

Population Dynamics

Irrespective of the breeds of the camel, the population of the camel in the country is declining at a very fast rate (Table 1). The livestock census figures reveals that the camel population in the country was 0.61 m in the year 1951 and it continued growing till it reached it's ever time highest

figure of 1.10 m in year 1972. However, the camel population in the country remained close to 1 million during for a period of about 25 years during 1966 to 1992. Since then the population has reduced by about 61% and the current population is 0.40 m (Livestock Census 2012).

Table 1. Camel population and growth trend in India

Year	Population ((in million)	Growth (%)
1951	0.60	29.6
1956	0.80	11.9
1961	0.90	10.65
1966	1.00	9.60
1972	1.10	0.00
1977	1.10	0.00
1982	1.08	-1.85
1987	1.00	-7.65
1992	1.03	2.95
1997	0.91	-11.65
2003	0.64	-29.65
2007	0.51	-18.25
2012	0.40	-22.55

The analysis of state-wise population of camels during the year 2007 and 2012 is very interesting and it reflects the current trend in camel husbandry that is prevailing in the country. There are eleven states viz. Rajasthan, Haryana, Gujarat, Punjab, Madhya Pradesh, Uttar Pradesh, Jammu & Kashmir, Karnataka, Chandigarh, Daman & Diu, Uttarakhand showing a decline in camel population during the year 2007 to 2012 but there are sixteen states showing an increase in the camel population during the same period i.e. 2007 to 2012. Similarly in the year 2007, there were 17 states in which the camel population was zero, the same has now reduced to 11. Reduced utility, mechanization and lifestyle are the chief reasons for the decline of camel population but increase in the population of camel and spread of camel population from 18 to 24 states and union territories of the country is intriguing. The increase in the number of camels in single digit such as in Goa, Jharkhand, Kerala and Meghalaya may be due to tourism or any other transient activity but the increase in two, three and four digits signifies alternate utility of the species. States viz. Nagaland, West Bengal, Chhattisgarh, Assam, Odisha, Delhi, Tamil Nadu, Arunachal Pradesh and Himachal Pradesh were having less than 128 camels in the state in the year 2007 but they now (2012) have camels in the range of 19-835. The increase in the number camels in the state of Bihar is highly significant. The number has increased from 215 to 8859 during this period.

The increase in the number of camels in the un-natural habitat indicates shift in the utility of the camels and transport / shift of camels from the breeding tract to the place of utilization. It is speculated that apart from tourism, the slaughter of camels for human consumption is picking up in this country either for domestic utilization or for export may be in its' own name or in the name of other species.

Looking at the above trend with a decline in population and shift in utilization of the species from its' main use as draught animal, the Government of Rajasthan as well as the ICAR-National Research Centre on Camel, Bikaner took initiatives to conserve and explore alternate use of the species for sustenance.

EFFORTS FOR SUSTAINABLE UTILIZATION

A. RAJASTHAN STATE GOVERNMENT

Camel: Declared as the State Animal of Rajasthan

The camel has so far been used as a pride animal. It has been used as an iconic animal to symbolise Rajasthan by Govt. of Rajasthan, Rajasthan Tourism, Rajasthan Bank, BSF- Camel corps and several other organisation. This pride animal still constitutes the glamorous part of republic day parade. Looking at the close association of camel in the art and culture of the society in the state and the current population status, the present Rajasthan Government under the leadership of Mrs. Vasundhara Raje Sindhia, honorable Chief Minister of Rajasthan, has declared camel as State Animal of Rajasthan on June 30, 2014 and for this declaration Bikaner city was choose probably because of the concentration of camel population around this place. Thus “The Camel” became the first domestic animal to be declared as “State Animal” in this country. In order to declare the camel as state animal of Rajasthan, appropriate preparation for drafting the document was done under the Chairmanship of Secretary, Animal Husbandry Department, Government of Rajasthan. The first draft was prepared under his chairmanship by Animal Husbandry Department and National Research Centre on Camel, Bikaner. Subsequently, the inputs were taken from other departments such as Rajasthan Cooperative Dairy Federation (RCDF), Forest, Rajasthan Livestock Development Board (RLDB), Insurance companies, NGOs, Rajasthan University of Veterinary and Animal Science (RAJUVAS), Health Department, Ayurved Department etc. and the draft “Camel Development Policy” was prepared. In brief, the actionable points of Camel Development Policy were: -

I. Policy Support

- A. Act (i) Ban on Camel Slaughter (Complete Ban or Females complete ban and Males after selection)
(ii) Restriction on camel export /migration
- B. Breeding Policy : New breeding policy with emphasis on camel milk production
- C. Sale of Camel Milk : Collection, processing and marketing of camel milk by organized sector (RCDF)
- D. Inclusion of camel in famine code
- E. Pasture Development: (i) Forest Area –Rational entry of camels for grazing, (ii) Pasture Land: Re-seeding and Plantation.

II. Incentives for Camel Breeding

- A. Support to camel breeders on birth of a camel calf –cash incentive for calf born, feed and mineral mixture for dams, treatment and other services.
- B. Loans, Subsidy and Insurance Support: Loan for new purchase, subsidy on sale of camel milk and insurance cover to all camels.

III. Breed Registration and Camel Breeders Association

For their own welfare and to address the smaller and localized issues

IV. Camel Development Cell

To look after all camel development activities

The Rajasthan Camel Bill 2015 Enacted

The state government took appropriate action for giving legal framework to the decision taken and “A Bill” for the formulation of act on above lines was prepared by the Animal Husbandry Department of the Rajasthan Government and it was named “The Rajasthan Camel (Prohibition of Slaughter and Regulation of Temporary Migration or Export) Bill, 2015”. After appropriate approval of the honourable President of the Country, the Bill was in enacted.

Projects for Research and Development

The Rajasthan University of Veterinary and Animal Science, Bikaner and Ayurved Department of Government of Rajasthan along with the ICAR-National Research Centre on Camel, Bikaner, ICAR-National Bureau of Animal Genetic Resources, Karnal and Department of Biotechnology were asked to work on camel genome, camel immunology and to explore the therapeutic utility of camel milk for human health. A project on Camel Genome was submitted by ICAR-NBAGR involving ICAR-NRCC and RAJUVAS. Another project for “Development of milch strain of camel and providing seed material for genetic improvement of farmers’ herd” was submitted by ICAR-NRCC under RKVY. The discussions are going on at different levels and hopefully the things would move further.

Camel Insurance

The State Government has launched an Insurance scheme named “Bhamashah Pashu Bima Yojana” for the livestock species including camel at subsidized rate. A camel owner can get maximum of five camels with a maximum cost of Rs.50000/- per camel insured at a subsidized rate of 3.5 % for a period of one year or 9% for a period of 3 years. This premium is further reduced by 70% in case of S.C., S.T. and B.P.L. category and by 50 % for general category. The Bhamashah scheme is basically for women empowerment and thus the benefit of this scheme can only be taken if the camels/ animals are insured in their name. The claim amount on the death of insured camel is directly transferred in their account.

Calf-Subsidy

It was felt that the camel owners are losing the interest in breeding their camels because a pregnant camel cannot be put to use for a substantial period and also to encourage the camel breeders to breed their camels at regular interval to have a check on the declining population of the species, the state government has launched a scheme worth Rs. 3135 lakh under RKVY for a period of 4 years. Under this scheme, a camel owner has to register his pregnant female camels and he will get Rs.3000/- when the calf is born and attains an age of 1 month. The second instalment of Rs.3000/- he will get when the calf attains an age of 9 months and the third installment of Rs.4000/- he will get when the calf attains the age of 18 months. They will have to insure these animals and when they sale these animals, they will have to inform to the nearest Veterinary Hospital. The treatment of these animals will be done free of cost.

FSSAI approve sale of Camel Milk for Human Consumption

The Food Safety and Standards Authority of India under section 16 (5) of Food Safety and Standards Act 2006 operationalize the Standards for Camel milk on November 29, 2016. For the raw, pasteurized, boiled, flavoured and sterilized camel milk the standards are set to a minimum of 6.5% SNF and 3 % Fat.

B. ICAR-NATIONAL RESEARCH CENTRE ON CAMEL, BIKANER

Talks of Camel: A Mission for Conservation of Camel

Aggrieved by the declining population of the camel and poor condition of the camel farmers in the Country, at ICAR-National Research Centre on Camel, Bikaner, I took an initiative in the year 2015 to help the State Animal of Rajasthan and named it as “Talks of Camel: A Mission for Conservation of Camel”. The ICAR-National Bureau of Animal Genetic Resources, Karnal supported this mission by funding for the Radio programme and other activities. This Mission had the following components:-

1. **Radio Programme-Untan Ri Bataan** (Talks of Camel) : Inspired by the “*Maan Ki Baat*” programme of Honorable Prime Minister, An All India Radio Programme “*Untan Ri Bataan*” (Talks of Camel) was broadcasted on every first and third Friday of the month from Bikaner, Jodhpur, Udaipur and Kota stations covering 21 districts of Rajasthan. The human population covered is about 4 crores. Three minutes time in the episodes was dedicated to answer the questions asked by the camel owners. In all 33 episodes covering different topics of camel husbandry were broadcasted. All episodes were uploaded on Google Drive and Sound Cloud and link posted on Facebook and WhatsApp for easy access 24X7 through computers, laptops and cell phones.
2. **Talks of Camel “Untan Ri Bataan” Logo:** In order to give identity and better visibility to the programme, a Colourful Logo utilizing the tri-colours of the National Flag was designed and used since April 16, 2015. The same has been published by the **Trade Marks Journal No. 1761, 2016**.
3. **Meeting with the Camel Farmers:** Knowing it well that in the present era also there are several Camel Farmers who doesn't listen to the Radio and are not aware of the Facebook, WhatsApp, You Tube etc., it was decided to organize farmers meeting in the Villages with the Camel Owners. Accompanying the broadcast of each Radio programme, it was decided to organize the meetings and question-answer sessions with the camel owners on every first and third Friday of the month. Additionally, a good number of extended meetings were also organized wherein apart from the deliberation on a particular topic, discussion on policy issues, question-answer sessions and on-site treatment of sick animals was also done. We used audio system to educate the farmers and shared real time photographs on WhatsApp immediately during and after the meeting. In order to serve the society, I took a decision to organize 100 such meetings in one year time and to our satisfaction we could organize 102 meetings in 90 villages spread across the state having sizable camel population. A total of 1943 camel owners / stakeholders were educated during these meetings. The **Limca Book of Records** has recognized this work as **The National Record**.
4. **WhatsApp Group:** “Talks of Camel” group on WhatsApp was created to share the programme details, News Items, Disease Photographs and links of talks uploaded on Google Drive and Sound Cloud. All through, it had 100 members including ICAR, SAU, Animal Husbandry Officers and Camel farmers.
5. **Cell Phone:** My Cell phone has contributed maximally and camel farmers are using it like 108 Service for them. Maximum support in terms of Veterinary Health Care has been extended.

6. **Facebook Page-Talks of Camel ऊंटां री बातां:** This page has been used to share the Programme details, National and International News Items, Disease Photographs and links of talks uploaded on Google Drive and Sound Cloud. Since April 16, 2015, the number of items posted is around 500 with an average of 500 views per post.
7. **Sound Cloud- Talks of Camel Channel:** Every month two experts give the Radio Talk on various aspects of Camel Husbandry. The same were uploaded after broadcast and their links forwarded to the stakeholders on WhatsApp, Facebook and group email for easy access 24X7 through the computers, laptops and cell phones. Hundreds of people have listen to the “Talks of Camel” programme through this channel.
8. **You Tube - Talks of Camel Channel:** The popularity of You Tube among cell phone users was also utilized for the purpose. All-important Talks delivered on All India Radio were converted into video films and uploaded on You Tube. The links were forwarded to the stakeholders on WhatsApp, Facebook and group email for easy access 24X7. Hundreds of stakeholders have listen to the programmes of Talks of Camel through this App.
9. **Google Drive-Talks of Camel Folder:** The space required to store one Radio Talk is about 27 MB. A folder named “Talks of Camel” on Google Drive was created for storing all the information, documents, photographs, audio, video files pertaining to this mission. The links were shared with the stakeholders through Facebook, WhatsApp and Group Emails.
10. **Treatment of Camel:** Around 2000 sick camels were treated for various ailments in this Programme
11. **GROUP EMAIL :** Immediately after the broadcasting and uploading of the Radio Programme on Google Drive and SoundCloud, the links were sent regularly to all staff members of National Research Centre on Camel, Bikaner; Director and In-charge Network Project, NBAGR, Karnal; Project Director, DKMA, ICAR, New Delhi; DDG (AS), ICAR, New Delhi and Experts. This was done to make the programme accessible to them at one click. The programmes are being sent to DKMA, NRCC Library and AKMU for sharing and storing the programmes in their ELIBRARY for subsequent use.
12. **Television Programme:** In order to create awareness in the general society about the conservation of camel and to support the camel farmers, ETV Rajasthan channel was contacted and they give full coverage of the programme in News at Prime Time i.e. 7.30 PM on June 26, 2015. On DD Kisan Channel, I was invited to participate in the Hello Kisan Programme, which was telecasted live on August 4, 2016. Additionally, the A1TV channel covered our programme twice.
13. **FM Radio:** FM Radio is very popular in the cities. 92.7 Big FM was contacted and they covered the programme twice and broadcasted each of them two-three times in their morning session “Big Chai” spanning around an hour or more.
14. **News Papers :** All leading News Papers of Rajasthan i.e. Dainik Bhaskar, Rajasthan Patrika, Dainik Navjyoti and small News Papers like Yugpaksh, Abhay India, National Rajasthan, Thar Express,

Desert Times, Thar Savera, Raftar, Khas Khabar etc. have continuously covered our programmes all through the year.

15. **Calendar, Posters, Banners, Pictures & Leaflets:** One attractive Calendar for the year 2016 focused on promoting camel husbandry was prepared and released on January 1st 2016. Very attractive posters, banners, pictures and leaflets were prepared for promoting camel husbandry.
16. **Documentary- ऊंटों की बातें Talks of Camel:** A Mission for Conservation of Camel has been prepared to cover and highlight the components of the programme along with the feedback from the stakeholders and assessment of the impact among the camel farmers.
17. **Exhibitions-** Exhibitions on Camel Husbandry was organised at 2 places in Udaipur district and one each in Jhalawar and Pratapgarh district to promote camel husbandry.
18. **Work Shop:** One day workshop with the Camel Milk Vendors was organised at Veterinary Polyclinic Campus, Udaipur to address various issues pertaining to sale of camel milk, human health benefits of camel milk, packaging, transportation and emarketing of camel milk through websites etc.
19. **Camel Competitions:** In state level Chandrabhaga Fair 2015- In order to promote rearing of best animals for breeding and production and to encourage the camel owners various competitions were organised and 40 Camel Owners were honoured.

Apart from Limca Book of Records, this work has received appreciation from the NARS officers, camel owners and the society as whole.

Exploring alternate uses of camel

Both *Camelus dromedarius* (single humped camel) and *Camelus bactrianus* (double humped camel) are the iconic animals for the mechanism of adaptation they have for the extremes of climatic situations. They survive in - 40 degree Celsius to +50 degree Celsius with scares of water and food resources. They are also known for the possession of single domain antibodies (12-15 kDa) and the unique defence mechanism against biotic stress (pathogens). They do not succumb to the diseases like foot and mouth disease and blue tongue.

Camel milk has been considered unique in terms of having low fat (1.5 -3%) with much higher concentration of long chained fatty acids than short chained fatty acids and is therefore considered healthier. The protein content is low (1-2.5%). It has longer shelf life. The lactose content is 3.8 - 4.3%, ash is 0.79% and total solids are 8-11%. It is rich in minerals like Iron (0.32-0.36 mg/dl), Zn (1.2-6.3 mg/dl), Copper (0.09-0.5 mg/dl) and vitamin B₁ (0.03 mg %), B₂ (0.04 mg %), B₆ (0.05 mg %), B₁₂ (0.0002 mg %) and vitamin C (40-50 mg/Kg). The essential fatty acids (linoleic and arachidic etc.) are available in adequate quantity. The camel milk acts as immunomodulatory due to the presence of high amount of lysozyme, lactoferrin, immunoglobulins and lactoperoxidase. The ratio of β -casein to κ -casein is considerably higher in camel milk. Lysozyme C and β -lactoglobulin are absent and Whey Acidic Protein and Peptidoglycan Recognition Protein are present. The fresh and fermented camel milk has been found to provide potential health benefits including angiotension I-converting enzyme-inhibitory activity, hypocholesterolaemic effect, hypoglycaemic effect, antimicrobial and hypoallergenicity effect.

The Therapeutic Use

The work carried out at the ICAR-National research Centre on Camel, Bikaner in collaboration with the SP Medical College, Bikaner and other institutes indicated that

1. The camel milk can be used for the management of type I diabetes (The Type I diabetes results from the autoimmune destruction of the insulin-producing beta cell in the pancreas) mostly in the patients having inherent deficiency of beta –cells.
2. The camel milk is useful in the treatment of tuberculosis.
3. The camel milk has been found useful in the treatment of autism.
4. The camel milk acts as a functional food.

The world literature especially from Israel, UAE, UK and France indicated that camel milk is useful in the treatment of Jaundice, Kala-azar, tuberculosis, heart patients, high blood pressure, milk allergy in children etc.

Diagnostic Kit

The Bhabha Atomic Research Centre, Mumbai in collaboration with ICAR-National Research Centre on Camel, Bikaner has developed a kit for the detection of thyroid cancer in human patients, utilizing the single domain antibodies of the camel.

Anti-Snake Venom

At present the work on production of Anti-Snake Venom against the local Snake utilizing camel model is in progress and the results obtained so far are very encouraging.

Milk Products

The Centre has developed a variety of products from camel milk and most selling products are tea, coffee, kulfi, flavoured milk and lassi.

Training to Camel Owners

With the support of state government under RKVY project, the Centre is regularly organizing training programmes for the camel owners.

Thus the health benefits of the camel milk, tourism and alternate uses of camel along with the policy and financial support from the state government and efforts of the dedicated scientists and veterinary officers to address the issues of this species would certainly help in sustaining the species.

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