

Environmental and Social Safeguards/issues and mitigation strategies

Project title: Identification of Quantitative Trait Loci for Milk yield, Fat and Protein Percent in Buffaloes

1. Basic information

A. Project Data

Project Statistics:

Total Cost: Rs. 856.3 lakh

Duration: Four years and three months

Location: Karnal and Pune

- **Consortium Leader** : National Bureau of Animal Genetic Resources, Karnal
- **Consortium Partners:** BAIF, Development Research Foundation
Urulikanchan, PUNE
- **Consortium PI:** Dr. Ramesh Vijh
- **Consortium CoPI:** Dr. Suresh B. Gokhale

Project Objectives

- I. Identification of QTL for milk yield, fat and protein percent in Buffaloes using Daughter Design in selected chromosomes
- II. Identification of positional candidate genes and development of markers in Buffalo based on cattle- human synteny
- III. Fine mapping of QTL with SNP markers

Brief Project Description

The genetic markers are synergistic to normal selection programs if incorporated in the Models of selection to increase the accuracy and efficacy. No information on production related molecular markers and QTLs is currently available in buffaloes. India with its 96.62 million buffaloes (56% of the World's total population) must take a lead to enhance the productivity of its buffaloes. The genetic markers are expensive to develop and returns from the initial research can take time. However, once the knowledge reaches a critical level gains accelerate enormously. This proactive research subproject is initiated with three important traits of milk yield, fat and protein percentage.

B. Environmental Category

2. Major issues in the subproject:

Social. Improvement in buffalo productivity leading to upliftment of economic condition of the farmers.

Environmental: Development of high yielding buffaloes in the field conditions and shall not affect biodiversity, health, natural habitat, land and fodder resources of the project area as the existing buffalo shall be genetically improved.

3. Safe guard policies triggered.

	Yes	No
Environmental Assessment (OP/BP 4.01)	[]	[X]
Natural habitat (OP/BP 4.04)	[]	[X]
Pest Management (OP/BP 4.09)	[]	[X]
Cultural Property (draft OP 4.11-OPN 11.03)	[]	[X]
Involuntary Resettlement (OP/BP 4.12)	[]	[X]
Indigenous Peoples (OD 4.20)	[]	[X]
Forests (OP/BP 4.36)	[]	[X]
Safety of Dams (OP/BP 4.37)	[]	[X]
Projects in disputed areas (OP/BP 7.60)	[]	[X]

4. Risk related issues

The subproject does not have any risk related issues associated with it.

5. Impact Assessment.

Enclosure I

A. Environmental safeguard: Activities, issues, impact and Mitigation measures.				
Activities	Issues	Anticipated level of Impact		Mitigation measure.
		Positive	Negative	
Buffalo improvement.	Upkeep and Maintenance of Improved buffalo	More income to the family by increased sale of milk enhanced production and reproductive efficiency		
Artificial Insemination	Veterinary infrastructure	The semen of high breeding value bull shall enhance productivity in the next generation		Encouragement for adoption of best management practices in animal husbandry.

Enclosure II

Social safeguard : Activities, issues, impact and Mitigation measures				
Activities	Issues	Anticipated level of Impact		Mitigation measure.
		Positive	Negative	

Buffalo improvement	Income Pattern	The income shall rise and standard of living shall improve		
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6. Potential indirect and / long term impacts due to anticipated future activities in the project areas (Assessment of anticipated conflict/ complimentarity with the current as well as those proposed for the next five years) in the areas of activities of the subproject.

The project shall have impact on Science and technology advancement and Genetic enhancement of buffalo productivity in the areas of operation of the project (as a spin off).

The likely impact in the field of Science and Technology field shall be by

- i. Development of a reference population with confirmed parentage that shall be available to carry out research work in the field of buffalo genetics.
- ii. Markers with respect to milk yield, fat and protein percent shall be available for usage in animal breeding programs.
- iii. The genetic markers shall complement traditional selection programs (Marker Assisted Selection) and this shall substantially enhance the genetic gain.
- iv. The gene markers found associated with the traits of interest may increase the genetic gain 2-3 fold (Gene assisted selection).
- v. Genome resources of buffaloes shall be enriched by heterologus markers and development of buffalo specific SNPs.
- vi. Project shall enhance the capability of scientists for the utilisation of knowledge of comparative genomics for carrying out work in lesser worked species of goats which are also important to India.
- vii. The country shall attain a postion of being global leader in the field of buffalo genomics.

Although the project is not meant for improvement of buffaloes in the field conditions as a developmental project. It shall improve the genetic worth of the research material (half sib families) as a spin off from the technical program of the project.

- i. The sires used in the project are of high genetic merit and have been selected from the field on the basis of their dams' milk yield. Their usage shall enhance the genetic merit of the populations on which they are being used. The genetic gains are cumulative and eternal and this shall increase the productivity of the next generation and shall eventually lead to higher income of the farmers in the areas of operation.
- ii. The breeding value of the sires used in the present study shall be known on the basis of recording of data on daughters with more accuracy.
- iii. The project shall sensitise the stakeholders for the utility of data recording.
- iv. The quality of milk shall also be improved for fat and protein contenet.
- v. Acceptance of AI in the field shall be improved.
- vi. The usage of scrub bulls in the area of operation shall be reduced.

7. Identify the key stakeholders and describe mechanism

The stakeholders workshop was held on 8-9 September, 2007 at NDRI Karnal under the guidance of Dr A Bandhopadhyay, National Coordinator, NAIP. The project was discussed at length with project workers from NBAGR and BAIF, Pune and expert members invited for the project. The full proposal has been prepared and submitted to PIU, NAIP after incorporating all the inputs of the workshop and recommendations of the expert members.

8. Consultation disclosures to be done in future:

The subproject shall be initiated with a launch workshop at NBAGR Karnal. A training cum workshop shall be organised by BAIF and NBAGR in the project area for training of the field workers and sensitisation of the farmers for their cooperation during the project period. Annual workshops shall be organised to review the progress as per milestones of the project. A mid term review workshop is also proposed to take any midterm corrections if required to fulfill the objectives of the project.

Consortia PI

National Coordinator

National Director

