Improving Animal Genetic Resource Value and Productive Performance in Asia

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Animal genetic resources are important subset of biology diversity, composed of the breeds and strains of domesticated animals that humankind have developed over the last 10,000 years. These is a need to consider the distinctive features of animal genetic resources, as well as the urgent need for maintaining and conserving domestic animal diversity for future generations. This study is aimed to characterize in terms of various aspects the phenotypic, genetic, environmental, molecular, etc. as prerequisite to utilize these genetic resources and to protect by various forms of Intellectual Property Rights in Asia including Bangladesh, Bhutan, Cambodia, Indonesia, Krygyz, Lao PDR, Mongolia, Nepal, Sri Lanka, Thailand, and Vietnam, which are the 11 AFACI member countries. The results of this study were published in the List and Pictorial Book of the six Asian countries and disseminated livestock genetic resource phenotype information of 14 species among the member countries. It has also collected genetic resources samples on 2 livestock 39 varieties 813 species of cattle and chickens from member countries. And, it has collected 2,781 genetic resources samples from 6 native livestock species in 7 countries and evaluated molecular biological characteristics for 17 livestock species. The results will contribute in the creation of awareness and encourage the need for livestock genetic resource management among AFACI member countries. Particularly, policy decision makers in Bangladesh, Bhutan, Nepal and Sri Lanka have recognized the importance of managing genetic resources of native livestock and provide an opportunity to develop them into national projects in the near future.

Key words : AFACI (Asian Food and Agriculture Cooperation Initiative), Asia, Disease, Epidemiology, Information Interchange System, Insect

Introduction

- Support the member countries' implementation on Resource Listing and Monitoring System (World Action Plan 1st Priority) for the management of FAO animal genetic resources.
- Improving the capablity to conserve frozen genetic resources for UN SDGs 2.5 (poverty-fighting), preserving endangered species in AFACI member countries.
  * AFACI(Asian Food and Agriculture Cooperation Initiative): An inter-governmental and multi-lateral cooperation body aiming to improve food production, realize sustainable agriculture and enhance extension service of Asian countries by sharing knowledge and information on agricultural technology.
- Information sharing on livestock genetic resources in Asia and development of information management capabilities for livestock genetic resources in member countries.

Methodology

- To catalogue and produce a handbook on each member country's present status, distribution, characteristics of animal genetic resources.
- To build a database of catalogued data/through methodical preserving, managing animal genetic resources by exchanging information among member countries.

Main Results

▶ Qualitative results

- Establishing an information exchange network for genetic resources of Native Asian livestock among member countries.


<Bangladesh Cattle Fair>

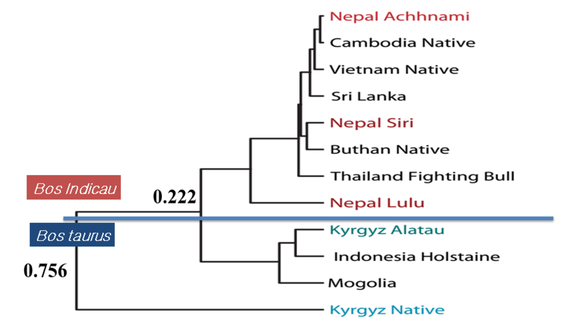

<Thailand Traditional Chicken Fair>


<Nepal Traditional Cattle ex situ Conservation>

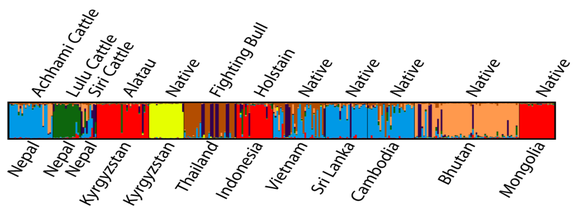
- Conducting the training program for capacity building of genetic characteristics analysis in member countries.


<Blood collection of sheep>


<Experiment of DNA extraction>



<Genetic relationship by population in cattle>



<Genetic relationship of cattle>

▶ Quantitative results

- Publication of List and Pictorial Book related to livestock genetic resources of 14 species of six Asian countries.
  - Collection and dissemination of livestock genetic resource phenotype information among the member countries: 6 livestock 66 variety
  - Collection of genetic resources samples from member countries: 2 livestock 39 variety 813 species of cattle and chickens

<Genetic diversity in Thailand>


<Phuphan1 black boned chicken>


<Phuphan2 white boned chicken>


<Phuphan3 black boned chicken>


<Betong chicken>


<Leuang Hang Kow chicken>

- Collection of genetic resources samples of native livestock maintained by member countries (2,781 from 6 livestock species in seven countries) and evaluation of molecular biological characteristics (17 livestock species).
- Activities for conservation of livestock genetic resources for 20 species, 27 training sessions for experts, 26 training sessions for farmers, 27 academic presentations, and fostering the workforce 1 person.
- (Bangladesh) Numbers of BNG and MC varieties in cattle were increased among farmers. About 130% total cattle number were increased (110 cattle in 2017 to 253 cattle in 2019).

<Changes in MC cattle types>

Cattle type	Munshiganj cattle		Indigenous cattle		Crossbred cattle		Total	
	No.	Mean±SD	No.	Mean±SD	No.	Mean±SD	No.	Mean±SD
2017	78	1.73±1.19	21	0.47±0.92	11	0.24±0.68	110	2.44±1.99
2019	114	2.53±0.76	93	2.07±1.16	46	1.02±1.06	253	5.62±2.12
Number of cattle increased	36 (46.15%)		72 (342.85%)		35 (318.18%)		142 (130%)	

(Percentage in the parenthesis indicate percentage increase of number of cattle)

<Changes in BNG cattle types>

Cattle type	North Bengal Grey cattle		Indigenous cattle		Crossbred cattle		Total	
	No.	Mean±SD	No.	Mean±SD	No.	Mean±SD	No.	Mean±SD
2017	48	1.12±0.79	38	0.88±1.26	17	0.40±0.73	103	2.40±2.07
2019	106	2.47±0.74	85	1.98±1.24	33	0.77±0.97	224	5.21±2.17
Number of cattle increased	58 (120.83%)		47 (123.68%)		16 (94.12%)		121 (117.47%)	

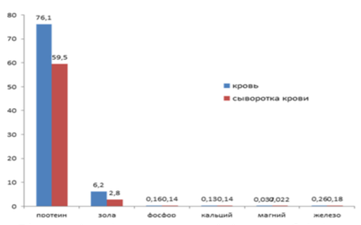
(Percentage in the parenthesis indicate percentage increase of number of cattle)

- (Kyrgyz) Yak breeding in high lands is highly profitable and is of great practical importance for raising the welfare of the people and the economy of the country.


<Yak breeding farm>

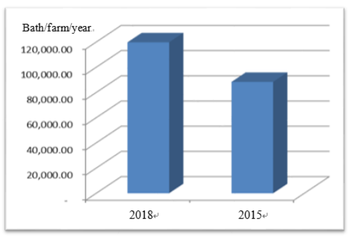

<Yak herd in high mountain>


<Yak meat>

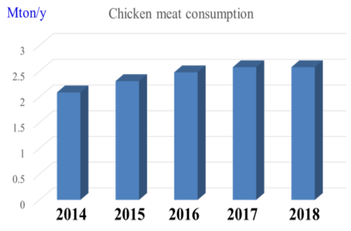


<Chemical composition of blood and blood serum of yak>

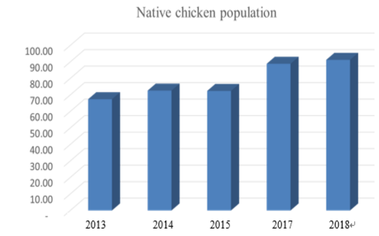
- (Thailand) The native chicken raising resulted to the increase in income from 2015 to 2018 and also improvement on farm account practice and increase of price.



<Farmer income>



<Chicken meat consumption>



<Native chicken population>

Impact

- Create awareness and encourage the need for livestock genetic resource management in member countries.
  - Policy decision makers in Bangladesh, Bhutan, Nepal and Sri Lanka recognize the importance of managing genetic resources of native livestock and provide an opportunity to develop them into national projects in the near future.

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