

Livestock Genetic Resources in Malaysia: the need for conservation

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MALAYSIA

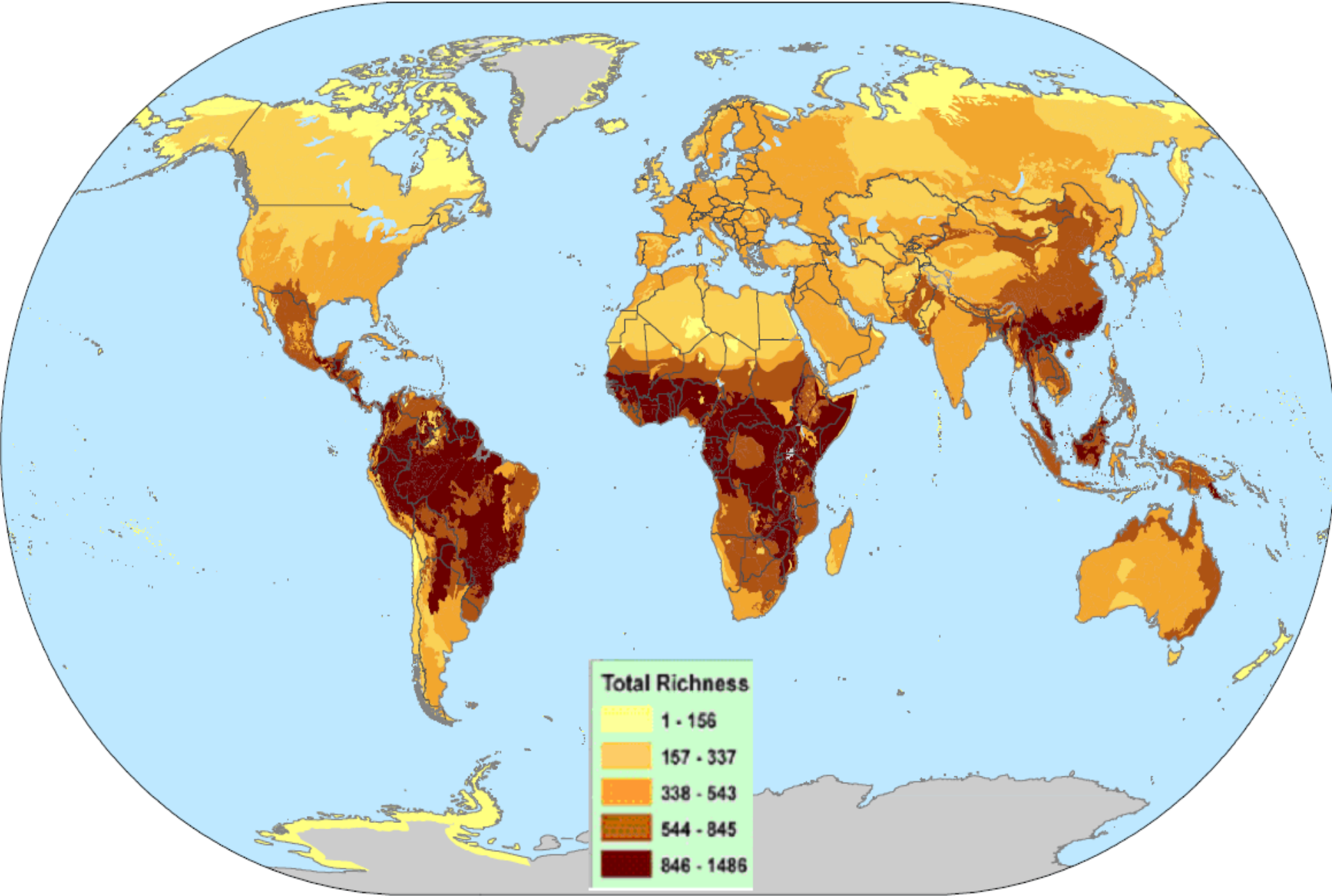
Malaysia

- Lies between Thailand and Singapore
- Total land area of 330,000 km²
 - 42 % in Peninsular Malaysia
- 35 % (11.6 mil. ha) suitable for agriculture
 - 6.3 mil. ha in Peninsular Malaysia
- Oil palm - 3.9 mil. ha & rubber -1.3 mil. ha)
- Humid tropics

The Malaysian rainforest

- Listed as the 14th most biodiverse nation in the world
- Ranks 4th in Asia - > 15,000 flowering plants & > 2000 medicinal plants
- Only about 50 under study

Wildlife Biodiversity Richness



Wildlife Biodiversity



Class of species

No. recorded

Amphibia

Aves



378

2198

Mammalia

Reptilia

Total

1094

807

4477



IUCN Red list

Category	No. of species
Extinct	1
Critically Endangered	37
Endangered	59
Vulnerable	129
Conservation dependent	6
Near Threatened	214

Source: IUCN (2007)

IUCN Red list

Class of species	Critical	Endangered
Amphibia	3	11
Aves	7	9
Mammalia	11	34
Reptilia	8	18
Total	29	72

Source: IUCN (2007)

National Biodiversity Policy

- *To transform Malaysia into a world centre of excellence in conservation, research and utilisation of tropical biological diversity by the year 2020*
- *To conserve Malaysia's biological diversity and to ensure that its components are utilised in a sustainable manner for the continued progress and socio-economic development of the nation*

Wildlife Conservation Activities

In-situ Conservation

2.12 mil. ha - National and State Parks, Wildlife Sanctuaries, Turtle Sanctuaries

14.28 mil. ha. - Wildlife Forest Reserves

Ex-situ conservation

Zoo, Botanic Gardens, Rice Gene banks, Arboretum, Forest Research Centre, Orang-Utan Rehabilitation Centre, Orchid Centre, Wildlife Rehabilitation Centre, Captive Breeding Station, Medicinal Plant Gardens

Conservation Activities



Herb Garden



National Zoo



Orang-Utan Rehabilitation Centre

Partial list of legislations relevant to biological diversity

Environmental Quality Act 1974

Fisheries Act 1985

Pesticides Act 1974

Plant Quarantine Act 1976

Customs - Prohibition of Exports - Order (1993)

Waters Act 1920

Taman Negara Enactment – Kelantan (1938), Pahang & Terengganu (1939)

Aboriginal Peoples Act 1954

Land Conservation Act 1960

National Land Code 1965

Protection of Wildlife Act 1972

National Parks Act 1980

National Forestry Act 1984

Parks Enactment 1984

Forest Enactment 1968

Fauna Conservation Ordinance 1963

National Parks Ordinance 1956

Wildlife Protection Ordinance 1958

Forests Ordinance 1954

Natural Resources Ordinance 1949 as amended by Natural Resources and Environment (Amendment) Ordinance 1993

Public Parks and Greens Ordinance 1993

Water Ordinance 1994

Domestic Animal Diversity Policy

- To optimize economic benefits from sustainable utilization of components of domestic animal diversity*
- To maintain and conserve animal genetic resources for the present and future generations*
- To enhance scientific and technological knowledge, educational and socio-cultural values of domestic animal diversity*
- To emphasize biosafety considerations in the development and application of animal biotechnology in line with ethical and religious needs*
- To ensure long-term food security for the nation and increase animal protein production*

Domestic Animals

Advantages

Adapted to local conditions – environment & food resources

Resistant to local diseases & parasites eg. Babesia, intestinal parasites

Disadvantages

Lower performance compared to temperate counterparts

Exist in low numbers & isolated areas

Farming preferences for improved breeds

Livestock Breeds In Malaysia

Species	Breeds & Major Crossbreds
Cattle	Australian Milking Zebu (AMZ) Bali*; Boran X Brahman & crosses (Brakmas) Charolais & crosses (Charoke) Droughtmaster; Girlando; Hereford X; Chianina X Holstein Friesian & crosses (Sahiwal Friesian, AFS) Jersey & crosses Kedah-Kelantan (KK) Limousin X, Local Indian Dairy (LID)*, Mafriwal (MFW), Nelore, Red Friesian X, Selembu*, Simbrah

** Breeds at risk; About 101 breeds (2000)*

Livestock Breeds In Malaysia

Species	Breeds & Major Crossbreeds
Buffalo	Borneo Buffalo, Kerbau Sawah, Murrah*
Sheep	Barbados Blackbelly, Dorper X, Dorset X, Dorsimal*, Long Tail, Malin*, Morada Nova X, Santa Inês, Segurena X, Southdown X, Suffolk X, Sufrimal*, Sussex X
Goat	Alpine, Anglo Nubian, Australian Feral Goat, Boer, Jermasia, Jamnapari, German Fawn, Kambing Gurun*, Katjang*, Saanen, Toggenburg

* Breeds at risk

Livestock Breeds In Malaysia

Species Breeds & Major Crossbreeds

Chicken	Ayam Hutan, Ayam Kampong, Ayam Sabong, Ayam Serama/Kapan, Ayam Sutera (Silky), Commercial Broiler Chickens, Commercial, Layer Chickens
Duck	Belibis, Itik Jawa, Itik Kampong, Khaki Campbell, Muscovy, Pekin, Serati/Nila
Geese	Angsa Kampong, France White Rhine
Quail	Bob White, Japanese Quail, Puyuh IKTA (Male line), Puyuh IKTA (Female line)
Ostrich	Black Neck, Blue Neck
Turkey	British United Turkey (BUT), Bronze Turkey

** Breeds at risk*

Livestock Breeds In Malaysia

Species	Breeds & Major Crossbreds
Pig	Duroc, Iban, Landrace, Large White Yorkshire, Sarawakian Bearded Pig, South China Pig*
Horse	Arabs, Bimo Siam, Kuda Padi, Miniature Horses, Polo Horses, Quarter Horses, Saddlebred, Shetland Ponies, Thoroughbred
Deer	Axis, Sambar, Sika, Red Deer, Timorensis
Rabbits	Californian, Carolina, Giant White Bouscat, Hyplus, New Sigmonoire, New Zealand White

* Breeds at risk

Indigenous livestock

1. Ruminants

- *Dairy breed - LID*
- *Beef breed - KK*
- *Goat – Katjang (meat)*
- *Sheep – Malin (meat)*

2. Non-Ruminants

- *Chicken – Ayam Kampung – meat/egg*
- *Swine – Local Chinese Pig*

Indigenous livestock

Dairy



- Locally adapted breed
- Good Milk quality, poor yield
- Milk ~ 500 kg/lactation
- Infused Friesian blood (>75%)
- *Vulnerable*

Local Indian Dairy (LID)

Imported livestock

Dairy



Modify environment ↑ milk
yield of purebred Friesian by
~ 20%.

Other health problems

High feed inputs

Friesian & its crosses

Imported livestock

Dairy



- Reasonably adapted to the environment
- Milk yield good and minimal health problems
- Lower feed inputs

Purebred Jersey

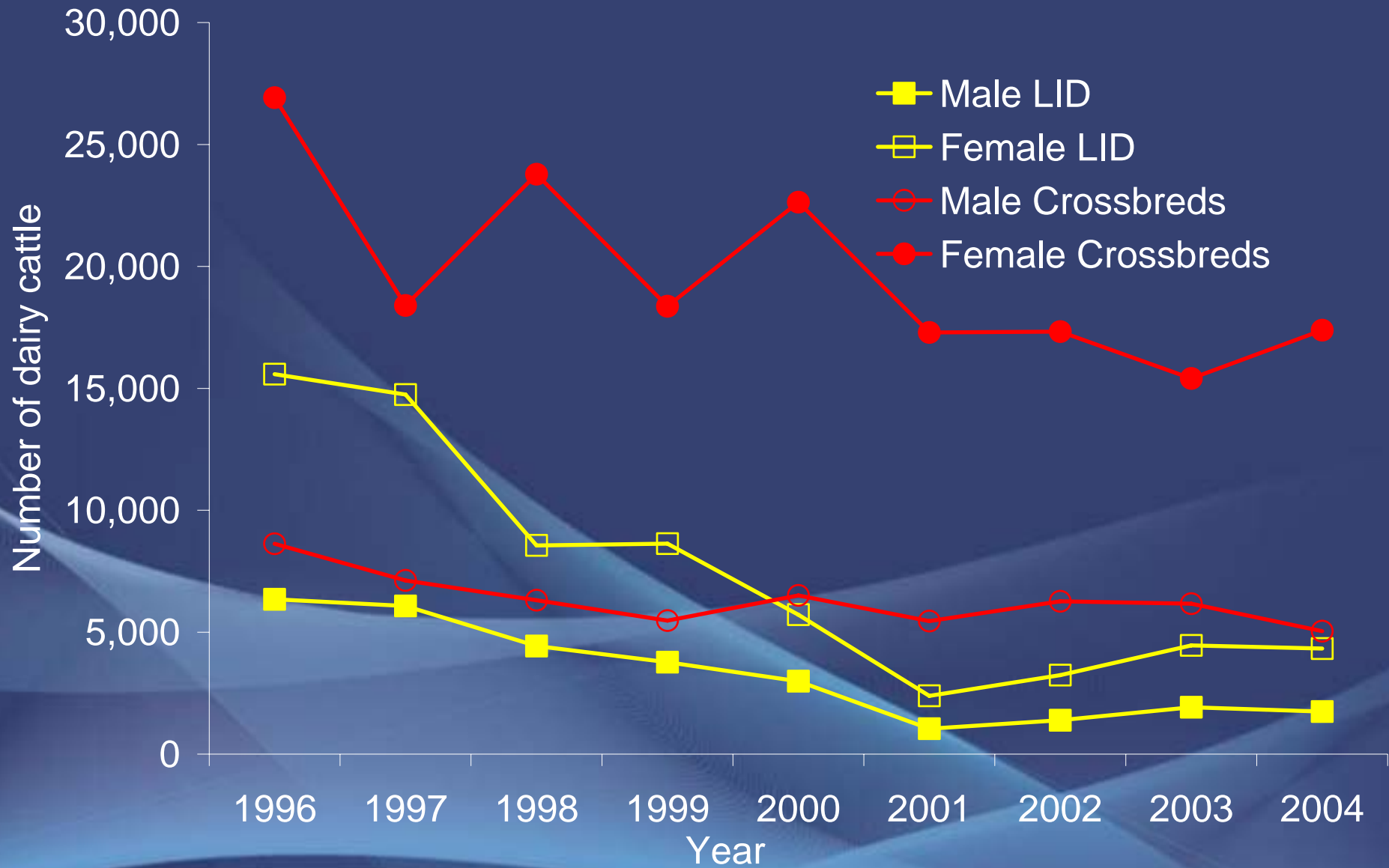
Imported livestock

Dairy



Purebred Jersey in an enclosed house

Dairy cattle population



Indigenous livestock

Beef



- Low body weight and growth rate
- Hardy & adapted to harsh conditions
- Adapted to local diseases and parasites

Kedah-Kelantan

Improved Indigenous livestock

Beef



Improved breeds; Brakmas, Charoke

Indigenous livestock

Goat

Kajang



- Low body weight and growth rate
- Hardy & adapted to harsh conditions
- Adapted to local diseases and gastro-intestinal parasites

Imported livestock

Goat

Boer



- Higher body weight and growth rate
- Moderately adapted to local conditions & diseases
- Generally raised intensively or semi-intensively

Indigenous livestock

Sheep

Malin



- Low body weight and growth rate
- Hardy & adapted to harsh conditions
- Adapted to local diseases and gastrointestinal parasites

Imported livestock

Sheep

Dorper



- Not yet evaluated locally

Indigenous livestock

Chicken

Ayam kampung



- Low body weight, growth rate & FCR
- Small market share - < 5%
- 95% imported breeds – Ross/Cobb

Indigenous livestock

Chicken

Ayam kampung



- Crossed with imported breed – Sasso
- Improved body weight, growth rate & FCR

Indigenous livestock

Swine

Wild boar/ Local Chinese Pig



- 100% imported breeds
- Wild population not utilised; Local Chinese pig almost extinct

Livestock Diversity

Importation of various cattle breeds



Simmental



Murray Grey

Livestock Diversity

Importation of various small ruminant breeds



Van Rooy



British Alpine

Endangered species of concern

Murrah - dairy type buffalo, introduced by Indian and Pakistani farmers in 1900.

Banteng - a wild species of *Bos javanicus* - black or brown in colour with white stockings and rump patch.

Seladang - variety of Gaur (*Bos frontalis*), high degree of disease resistance, numbers ↓ decreasing rapidly.



Murrah buffalo



Bos javanicus



Seladang

Methodologies used in Breeding Strategies

- Multi-trait selection index construction
- Optimization tools for breeding plans
- Electronic database related to recording schemes
- Genetic evaluation Software for: phenotypic selection breeding values
- Reproductive technologies (AI, ET, etc.)
- Micro satellite linkage maps for QTL identification for Marker Assisted Selection

Conservation affords

In situ conservation

Undertaken in smallholder farms, commercial farms and on integration farms in the plantation (tree crop)

Ex situ conservation

Local Chinese Pigs - in the National Zoo, Selembu cattle maintained at the Livestock Center.

Semen Bank - National Institute of Animal Biotechnology

Semen & Embryo Banks – NAEC (set up in 2008)

Constraints to indigenous animal conservation

- Profitability of the animal industry - especially ruminants ↓
- Development of AnGR influenced by markets and demands for animal products – eg. *Dorper*, *Boer* etc
- Lack of sufficient personnel having relevant knowledge/ training (data management, breed evaluation, selection)
- Lack of non-labor intensive, automated farming systems
- High cost of maintenance – feeding etc.
- Lack of national development program for each species
- Lack of coordinated involvement of the government departments concerned, institutions and the private sector

Major threats to farm animal AnGR

- Decreasing land available for agriculture
- Habitat loss due to increased commercialization and urbanization
- Poaching, accidents, attacks by predators, food poisoning through pesticides and herbicides
- Small and non-viable populations of AnGR
- Health issues - introduction of new diseases into the country
- Increased slaughter or extraction rate
- Natural Environmental factors such as floods, fire and pollution
- Lack of awareness concerning conservation issues and needs

Major features of AnGR conservation

Guided by the National Policy on Biological Diversity (1998)

- Expand the network of *in situ* conservation farms
- Strengthen *ex situ* facilities – NIAB, NAEC
- *Ex situ* conservation activities - include all threatened livestock breeds and to facilitate breeding and genetic improvement activities
- Involve local communities & the use of farm AnGR
- Creation of zoned livestock areas to protect AnGR development
- Determine optimum population sizes for breed conservation
- Review existing legislation, regulatory and management frameworks and programs to conserve livestock breeds
- Enhance the sustainable utilization of AnGR - bioprospecting activities
- Develop AnGR resource accounting methods, which promote conservation and sustainable use of domestic animal diversity



*Thank you
for your attention*