The National Livestock Breeding Policy

Guidelines and Strategies for Sri Lanka

Ministry of Livestock and Rural Community Development

Department of Animal Production & Health,

P.O.Box 13, Gatambe, Peradeniya.

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Ministry of Livestock and Rural Community Development
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Contents

	Page No
1. Preface	1
2. National Animal Breeding Committee	2
2.1 Composition	2
2.2 Duties and Functions	2
2.3 Members of the National Animal Breeding Committee	3
2.4 Members of the sub Committee to Revise the Animal Breeding Policy	3
3. General Definitions	4
3.1 Management Systems	4
3.1.1 Cattle and Buffaloes	4
3.1.2 Goats and Sheep	4
3.1.3 Swine	5
3.2 Animal Types	5
3.2.1 Dairy type	5
3.2.2 Draught type	5
3.2.3 Meat type	5
3.2.4 Dual type	5
3.3 Genetic Groups of Livestock	6
3.3.1 Cattle	6
3.3.2 Buffaloes	6
3.3.3 Goats	6
3.3.4 Sheep	6
3.3.5 Swine	6
4. Review of the Livestock Breeding Activities in Sri Lanka	7
5. Agroclimatic Zones of Sri Lanka	11
5.1 Agroclimatic Zones of Sri Lanka	12
5.2 Central Province	13
5.3 Sabaragamuwa Province	14
5.4 Uva Province	15
5.5 Southern Province	16
5.6 Western Province	17
5.7 North Western Province	18
5.8 North Central Province	19
5.9 Eastern Province	20
5.10Northern Province	21
5.11 Salient Features of Agroclimatic Zones	22

Contents

	Page No
6. Cattle Breeding	23
6.1 Cattle Breeding in the Field	24
6.1.1 Up Country Wet Zone	24
6.1.2 Up Country Intermediate Zone	25
6.1.3 Mid Country Wet Zone	26
6.1.4 Mid Country Intermediate Zone	27
6.1.5 Low Country Wet Zone	28
6.1.6 Low Country Intermediate Zone	29
6.1.7 Low Country Dry Zone	30
6.2 Cattle Breeding in the Nucleus Farms	31
7. Buffalo Breeding	33
7.1 Buffalo Breeding in the Field	34
7.1.1 Whole Country	34
7.2 Buffalo Breeding in the Nucleus Farms	34
8. Goat Breeding	35
8.1 Goat Breeding in the Field	36
8.1.1 Up Country Wet Zone	36
8.1.2 Up Country Intermediate Zone	36
8.1.3 Mid Country and Low Country	37
8.2 Goat Breeding in the Nucleus Farms	38
9. Sheep Breeding	39
9.1 Sheep Breeding in the Field	40
9.1.1 Whole Country	40
9.2 Sheep Breeding in the Nucleus Farms	40
10. Pig Breeding	41
10.1 Pig Breeding in the Field	42
10.1.1 Whole Country	42
10.2 Pig Breeding in the Nucleus Farms	42
11. Indigenous Livestock	43
11.1 Breeding of Indigenous Livestock	44
11.2 Some Facts About Indigenous Livestock in Sri Lanka	45
12. Role of the State and Private Sector Agencies in Implementation of the Breeding Policy	47
Annexure I: Continuous grading up of existing population with exotic types	49
Annexure II: Grading up of existing population with exotic breed up to 75% blood level	50
Annexure III: Grading up of existing population with exotic breed up to 50% blood level	51
Annexure IV: Production of two way and three way crossbred pigs under 3-tier system	52
13. Acknowledgments	53

1. Preface

The Department of Animal Production and Health of the Ministry of Livestock and Rural Community Development is pleased to present "The National Livestock Breeding Policy, Guidelines and Strategies for Sri Lanka"

The Document captioned "The National Breeding Policy for Dairy cattle in Sri Lanka" was first published in January 1989 focusing on Cattle Breeding activities in the field and subsequently in October 1994 "The National Breeding Policy Guidelines for Livestock in Sri Lanka" was published focusing on cattle, buffaloes, goats, sheep and pigs both in state farms and in the field.

Since it has been well over fifteen years from last publication a need arose to revise these guidelines utilizing the experiences gained while practicing the former guidelines. Accordingly this document has been revised by a Revision Sub Committee appointed by the National Animal Breeding Committee.

This document covers the national breeding policy guidelines for cattle, buffaloes, goats, sheep and pigs both in the field and in the state farms. The document also includes new sections on conservation and utilization of indigenous animal genetic resources realizing the value of indigenous breeds and the necessity to conserve and develop them. The need to apply long term strategies in cross breeding programmes while conserving the indigenous animal genetic resources is highlighted.

Artificial insemination in cattle was first established in Sri Lanka in 1937 and seventy years of cross breeding and up grading programmes carried out in Sri Lanka have led to the existing animal population with varying degrees of genetic make up and production potential which can not be harnessed due to poor management systems adapted and the scarcity of proper records.

The choice of breeds and definition of breeding goals in relation to the prevailing environmental and management systems adapted by farmers, the knowledge and skills of all stakeholders in livestock industry and proper recording system will result in successful application of breeding policy laid down in this document to implement a sustainable breeding programme in Sri Lanka to achieve self sufficiency in milk and other livestock produce.

Dr. A.D.N.Chandrasiri
Director General
Department of Animal Production and Health

2. National Animal Breeding Committee

2.1 Composition

National Animal Breeding Committee (NABCo) is formed by the Ministry to provide guidance to the state and private sector agencies on all matters related to animal breeding. This committee is appointed by the Secretary, Ministry of Livestock and Rural Community Development, and comprised of members from the Ministry, Department of Animal Production and Health, Provincial Departments of Animal Production and Health, National Livestock Development Board, Faculty of Veterinary Medicine and Animal Science, Faculty of Agriculture and Private entrepreneurs engaged in livestock breeding.

2.2 Duties and Functions

The main duties and functions of the National Animal Breeding Committee are

a. Planing, monitoring and coordination of the animal breeding activities

b. Decision making on the introduction of new germplasm into the country

c. Review and recommendation of the breeding strategies periodically

2. 3 Members of the National Animal Breeding Committee

Dr. A.O. Kodituwakku	Additional Secretary /LD	Ministry of Livestock &Rural Community Development
Dr. A.D.N. Chandrasiri	Director General	Department of Animal Production and Health
Dr. Mrs. H.M.S.P. Herath	Former Director General	Department of Animal Production and Health
Dr. C. Pathiraja	Chairman	National Livestock Development Board
Prof. B.M.O.A.Perera	Senior Professor	Faculty of Veterinary Medicine &Animal Science, University of Peradeniya.
Prof. Mrs. Pradeepa Silva	Professor	Faculty of Agriculture, University of Peradeniya
Prof. C.M.B. Dematawewa	Professor	Faculty of Agriculture, University of Peradeniya
Dr. Basil Alexander	Senior Lecturer	Faculty of Veterinary Medicine &Animal Science, University of Peradeniya
Dr. Wasantha Piyadasa	Former Director/ Animal Breeding	Ministry of Livestock &Rural Community Development
Dr. B. Sivayoganathan	Director/ Animal Breeding	Ministry of Livestock &Rural Community Development
Dr. D.R.T.G. Ratnayaka	Director/ Animal Breeding	Department of Animal Production and Health
Dr. Mrs. M.M.J. Amunugama	Provincial Director	Provincial Department of APH (Central)
Mr. D.V.S.de S. Gamage	Deputy Director / Veterinary Research	Department of Animal Production and Health
Mr. A.S. Premasundara	Assistant Director/ Dairy Development	Department of Animal Production and Health
Dr. S.C. Kaduwela	Assistant General Manager	National Livestock Development Board
Dr. L.W.N. Samaranayaka	Deputy Director`/ Animal Breeding	Department of Animal Production and Health
Dr. Mrs. W.M.S.P. Weerasinghe	Veterinary Research Officer	Department of Animal Production and Health

2. 4 Members of the Sub Committee to Revise the Animal Breeding Policy

1.Dr.A.O.Kodituwakku (Chairman)
2.Dr. A.D.N. Chandrasiri (Convenor)
3.Dr.Mrs.H.M.S.P.Herath
4.Dr. B. Sivayoganathan
5.Prof. Mrs. Pradeepa Silva
6.Mr. A.S. Premasundara
7.Dr. D.R.T.G. Ratnayaka
8.Prof. C.M.B. Dematawewa
9.Dr. S.C. Kaduwela
10.Dr. L.W.N. Samaranayaka
11. Dr. Mrs. Shalini Weerasinghe

3. General Definitions

3.1 Management Systems

3.1.1 Cattle and Buffaloes:

Intensive Management System

This is a high input and high output system. Animals are housed and individual attention is given to the animals. Zero grazing is practiced and the animals are fed on high quality grass with adequate supplementation of vitamins, minerals and concentrate feed to commensurate with the production levels and to meet the energy requirement.

Semi-intensive Management System

This is a moderate input and moderate output system. Under this management system animals are provided with housing with limited grazing. Supplementation of vitamins, minerals and concentrate feed is limited.

Extensive Management System

This is a low input and low output management system. As the animals are sent out for grazing, this system requires grazing lands that has to be demarcated for their sustainability. Very often the animals are fed on poor quality pasture and fodder without any supplementation of vitamins, minerals or concentrate feed. They may be allowed to graze during day and night or paddocked in the nights.

3.1.2 Goats and Sheep

Intensive Management System

This is a high input and high output system of management specialized in milk and/or meat production. This system of management is usually a complete stall fed system. In some herds a limited level of grazing under improved types of pastures and fodder is practiced. These animals are fed with vitamins, minerals and concentrate feed to commensurate with production levels.

Semi-intensive Management System

This is the management system, which includes limited stall-feeding at night with high level of grazing during day time under improved pasture and fodder. Hence it is a moderate input and moderate output system. Animals are also fed with vitamins, minerals and concentrate feed.

Extensive Management System

This is a low input and low output management system with very little or no supplementary feeding of vitamins, minerals or concentrate feed. The animals are grazed under low quality pasture and fodder. Usually these free grazing animals are provided with night shelter.

3.1.3 Swine

Intensive Management System

This is a high input and high output management system. The animals are housed and stall-fed with vitamins, minerals and concentrate feed.

Semi -Intensive Management System

This system includes some form of housing. Animals are fed with various types of locally available feed materials with low level of supplementary feeding.

Extensive/ Scavenging System

Animals are sent out for scavenging during day time and provided with shelter during night. In Some instances the animals are tethered and fed with poor quality locally available feeds and household refuse.

3.2 Animal Types

3.2.1 Dairy Type

Animal that has been selected and bred only for milk production.

3.2.2 Draught Type

Animal that has been selected and bred only for draught purpose.

3.2.3 MeatType

Animal that has been selected and bred only for meat production.

3.2.4 Dual Type

Animal that has been selected and bred for two purposes dairy/draught/ meat

General Definitions
contd...

3.3 Genetic Groups of Livestock

3.3.1 Cattle

Lanka cattle are the indigenous cattle of Sri Lanka.

Zebu /*Bos indicus* cattle are those, which have a prominent hump, a dewlap and and an umbilical fold. They are originated in the Indian subcontinent.

Temperate/ *Bos taurus cattle* are the cattle of European origin.

Crossbred cattle are those with gene combinations of two or more of the above categories of cattle.

3.3.2 Buffaloes

Lanka buffaloes are the indigenous buffaloes of Sri Lanka.

Reverine buffaloes are the dairy type buffaloes originated in the Indian subcontinent.

Crossbred buffaloes are those with various gene combinations of above categories of buffaloes

3.3.3 Goats

Indigenous goats are those with no admixture of exotic inheritance.

Exotic types of goats are the dairy and dual purpose goats imported from other countries.

Crossbred goats are the animals having the gene combination of any two or more of the above types.

3.3.4 Sheep

Jaffna local sheep is the indigenous sheep predominantly found in Jaffna peninsula.

Exotic types of sheep are the breeds imported from other countries.

Crossbred sheep are the animals having the gene combination of any two or more of the above types.

3.3.5 Swine

Indigenous pigs are those with no admixture of exotic inheritance.

Exotic types of pigs are the improved breeds of pigs imported to Sri Lanka.

Crossbred pigs are the animals having the gene combination of the above two categories or gene combination of two or more of any exotic types.

4. Review of the Livestock Breeding Activities in Sri Lanka

Dr. A.D.N. Chandrasiri

There are records indicating that the ancient kings of Sri Lanka maintained their own dairies. The main objective of maintaining these herds was to get milk and milk products which is known as *"Pasgorasa"* for their consumption. Although evidence is not available, there would have been a proper selection, breeding and culling program for these cattle. It is believed that the famous "White cattle" in the Eastern province are descendents of those royal herds. White colour is considered as a sign of cleanliness and prosperity.

Systematic dairying was started in Sri Lanka during colonial times. The British superintendents, who managed the tea estates in the up-country area, imported temperate breeds of dairy cattle for rearing in the tea estates to fulfill their requirement of fresh milk. The majority of the estate workers were of Indian origin and they also had the habit of drinking fresh milk. The European rulers provided basic infrastructure facilities in their estates and promoted rearing of dairy cattle. The male calves born to imported animals were given to the estate workers who reared them and used for upgrading their cattle. The resulting crossbred generation had higher milk production and was very popular among the local dairy men. A synthetic population was gradually evolved by *inter-se* mating among these animals. As the ancestors of these animals were shipped from the Cape of Good Hope in South Africa, the new synthetic breed was named as "Cape" cattle. This was the first locally evolved dairy breed in Sri Lanka. Unfortunately there had not been both a proper selection and breeding program to maintain this valuable breed of dairy cattle or to conserve the germplasm of these animals. After establishment of the Artificial Insemination and natural breeding programs using exotic dairy breeds, gradual genetic deterioration of Cape cattle took place and now this breed is considered as extinct.

Purely due to the involvement of the Europeans and the estate workers, the up country area fast developed into a milk-shed area. Government involvement in dairy cattle breeding began with the establishment of Karagoda-Uyangoda and Polonnaruwa farms in 1935 and Ridiyagama farm in 1936. The first up country farm was established in 1941 at Bopathalawa and later at Ambewela. The main objective of these farms was to supply quality breeding materials to the dairy farmers. Subsequently the State interest was diverted to other dry zone areas like Thamankaduwa where a large extent of natural grazing land was available. This was converted to the main milk producing area in 1950's. Several large scale cattle farms with zebu and zebu crosses (Tarpakar and Sindhi) were also established in Kandakaduwa and Thrikonamaduwa area to provide breeding stocks to the public.

Review of the Livestock Breeding Activities in Sri Lanka contd...

Total number of cattle and buffaloes reared in Thamankaduwa complex was around 30,000. To support this long term breeding program the Polonnaruwa livestock farm was converted in to Central Livestock Research Station (CLRS). Since 1935 Cattle, buffaloes and goats were imported into the country from time to time and those imported stocks were also maintained in the government farms as nucleus stock. Crossbreeding experiments which were carried out at Karagoda-Uyangoda in the 50's and at Undugoda cattle breeding stations during 70's and 80's indicated a significant heterosis effect in the F1 generation.

During 1970's the total number of cattle, buffalo, swine, sheep and goat breeding farms in the country was 21 and these farms were managed by the Department of Agriculture. All these farms were handed over to the Department of Animal Production and Health (DAPH), when the new department was created in 1978. The DAPH managed these farms to fulfill the national requirement of high quality breeding animals. Subsequently those farms were handed over to the National Livestock Development Board (NLDB) during early 90's. The DAPH still maintains two goat breeding farms at Imbulandanda in Matale and at Thelahera, in Nikaweratiya.

The Mahaweli Authority of Sri Lanka (MASL) which was established under the Mahaweli development program also got involved in the dairy and draught animal development activities and established five livestock farms during late 70's and early 80's. Two of them have been already converted in to public-private sector joint ventures and the balance still remains with the MASL.

Many live cattle, buffaloes, sheep, goats and swine, and semen of all species except sheep have been imported into Sri Lanka from time to time for the breed improvement programs. DAPH is the legal authority for the importation of livestock breeding materials into Sri Lanka. Though the private sector involvement in the livestock breeding activities was limited at the beginning, now the situation has changed. Few large and medium scale cattle, buffalo, goat and swine farms have been established and there is a trend of increasing the private sector involvement in livestock activities.

Artificial Insemination (AI) in cattle was started in Sri Lanka in 1937. The first AI calf named as “Simon” was born in 1938 in a farm at Meewathura, Peradeniya. Artificial insemination as a national program was started in 1950. The first semen supply center was established at Ambewela cattle farm in 1952. Semen collection from buffaloes (Murrah) was commenced in 1954. In 1960 the semen processing units were established at Kundasale and Tinnaveli. At present there are three Semen production centers at Kundasale, Polonnaruwa and Thinneveli. The deep frozen semen technology was introduced in 1966 and the private AI service was established in 1979.

Review of the Livestock Breeding Activities in Sri Lanka contd...

Since then, there was a slow but steady improvement of the AI service and in 2009, the total numbers of AI performed in cattle, buffaloes, goats and swine were 165853, 3046, 4207 and 464 respectively.Goat breeding station at Kottukachchiya was started in 1961. In 1970 goat AI service was established at field level in Jaffna.

There had been several foreign and local funded projects to support livestock breeding activities in Sri Lanka as shown below.

Project	Donor Agency	Duration
FAO/SIDA Animal Breeding Project	Sweden	1972
Sri Lanka German Goat Development Project	FRG(GTZ)	1982-1990
Sri Lanka/Asian Development Bank (SL/ADB) Livestock Development Project	ADB	1983-1991
Livestock Planning Project	FRG(GTZ)	1983-1992
Sri Lanka/Swiss Livestock Development Project	Swiss Organization for Development and Cooperation (Intercooperation)	1984- 1988
Sri Lanka/ Netherlands Livestock Development Project	The Netherlands Government	1986-1991
Sri Lanka Agriculture Research Project	World Bank	1987-1996
Agriculture Rehabilitation Project	ADB/FRG	1989-1992
Minipe/Nagadeepa Irrigation Rehabilitation Project	OECF of Japan	1990-1995
Smallholder Integrated Livestock Extension Project (SILEP)	FRG (GTZ)	1992-1994
Artificial Insemination Incentive Scheme	Sri Lankan Government	1992-1994
Heifer Calf Rearing Scheme I	Sri Lankan Government	1992-1994
Livestock Breeding Project	Sri Lankan Government	1998-2003
Heifer Calf Rearing Scheme II	Sri Lankan Government	2008
Genetics and Feeding Management Improvement Project(GFMI)	Sri Lankan Government and Japan (JICA)	2009
Dairy Cattle & Buffalo Development project	Sri Lankan Government and FAO	2010

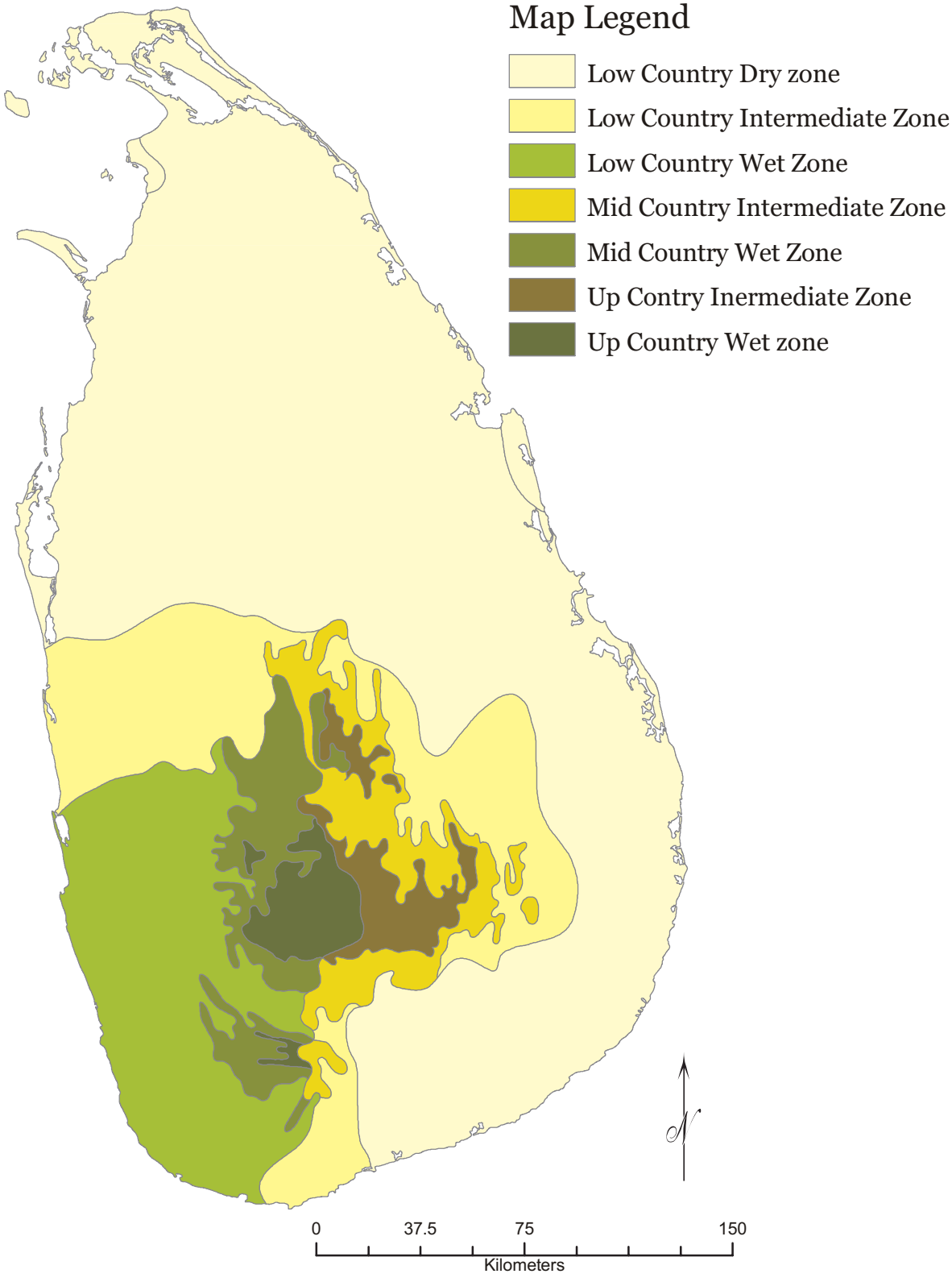
Review of the Livestock Breeding Activities in Sri Lanka contd...

Swine artificial insemination using fresh semen was first carried out in 1961 using semen imported from Britain. Pig breeding station at Welisara was established in 1961. With the importation of deep frozen pig semen by the DAPH in 2001 the commercial application of swine AI was commenced. The first swine AI using deep frozen pig semen was carried out in 2001 at the Horakelle livestock farm. In 2004 the Swine Semen Production Center was established at Kotadeniyawa Livestock Training Center and at present there is a big demand for swine AI in Colombo and Gampaha districts.

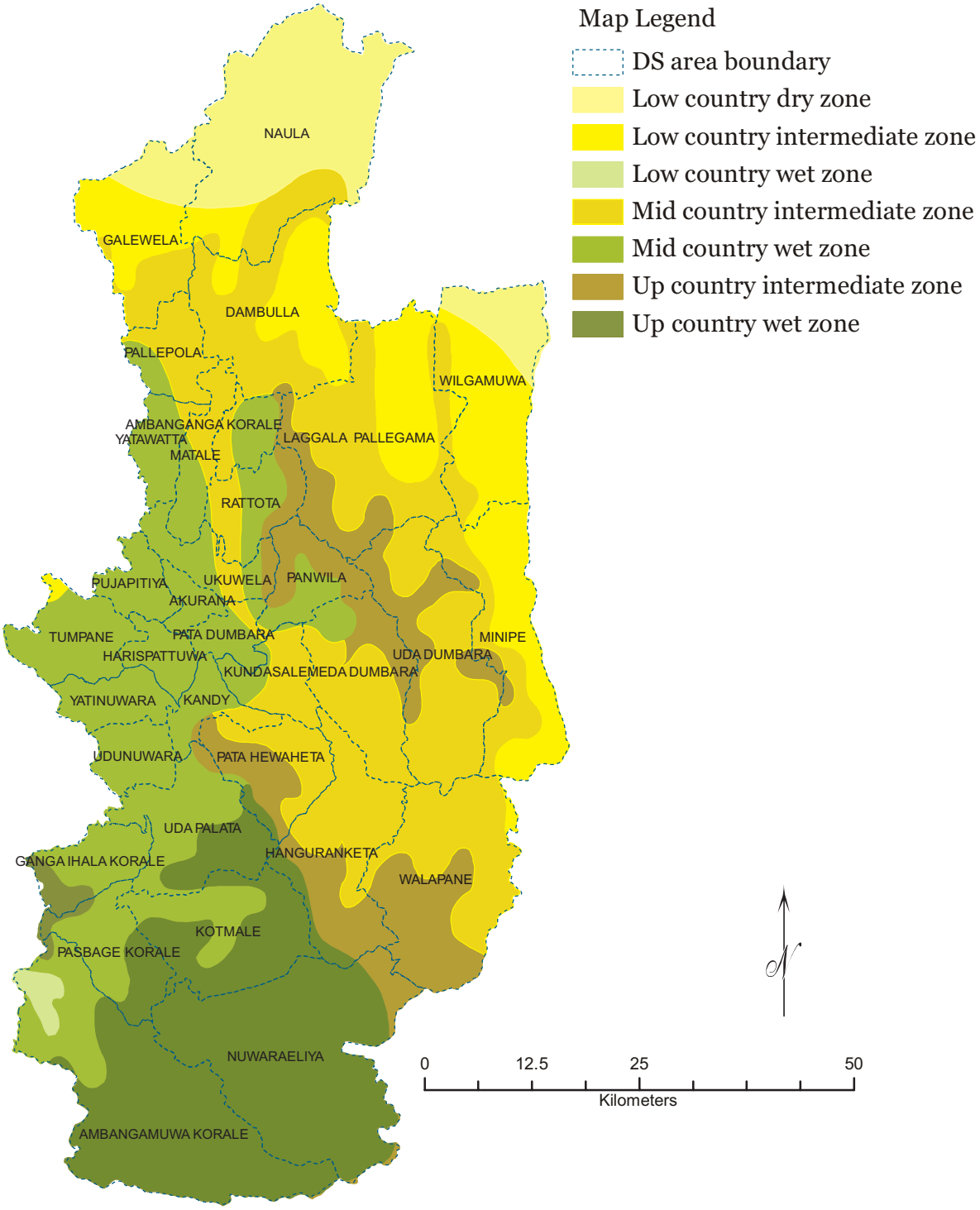
There had been several attempts by the local scientists in the past to establish novel breeding technologies such as embryo transfer and in-vitro fertilization in Sri Lanka. The first ET goat (Peradeniya Kumari) was born in 2007 at the experimental farm of the Faculty of Veterinary Medicine and Animal Science of the University of Peradeniya. Deep frozen cattle embryos were imported to Sri Lanka for the first time in 2006 and the first ET calf (Apeksha) was born in 2007 at Bopathalawa livestock farm that belongs to the NLDB.

5. Agroclimatic Zones in Sri Lanka

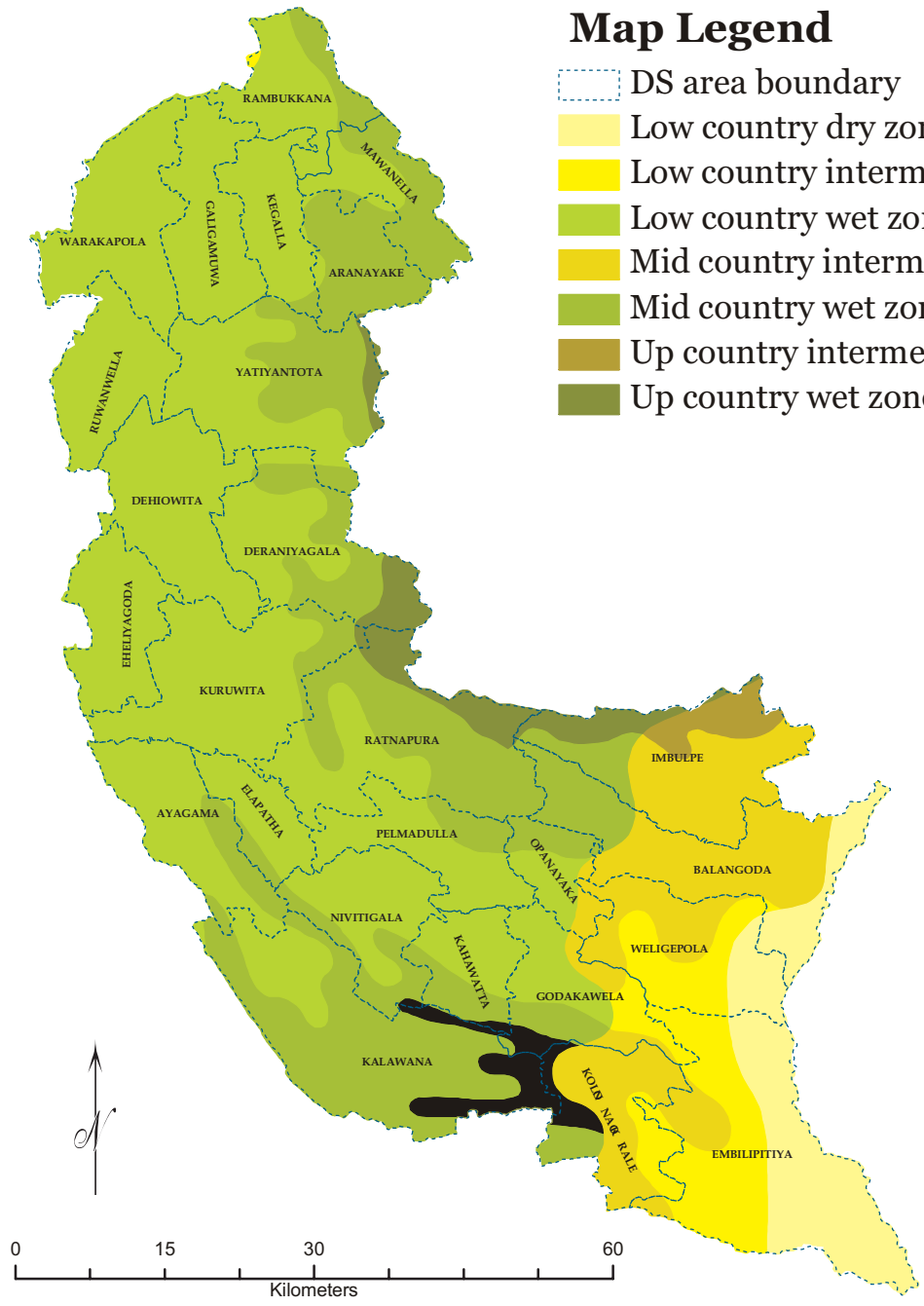
5.1 Agroclimatic Zones in Sri Lanka



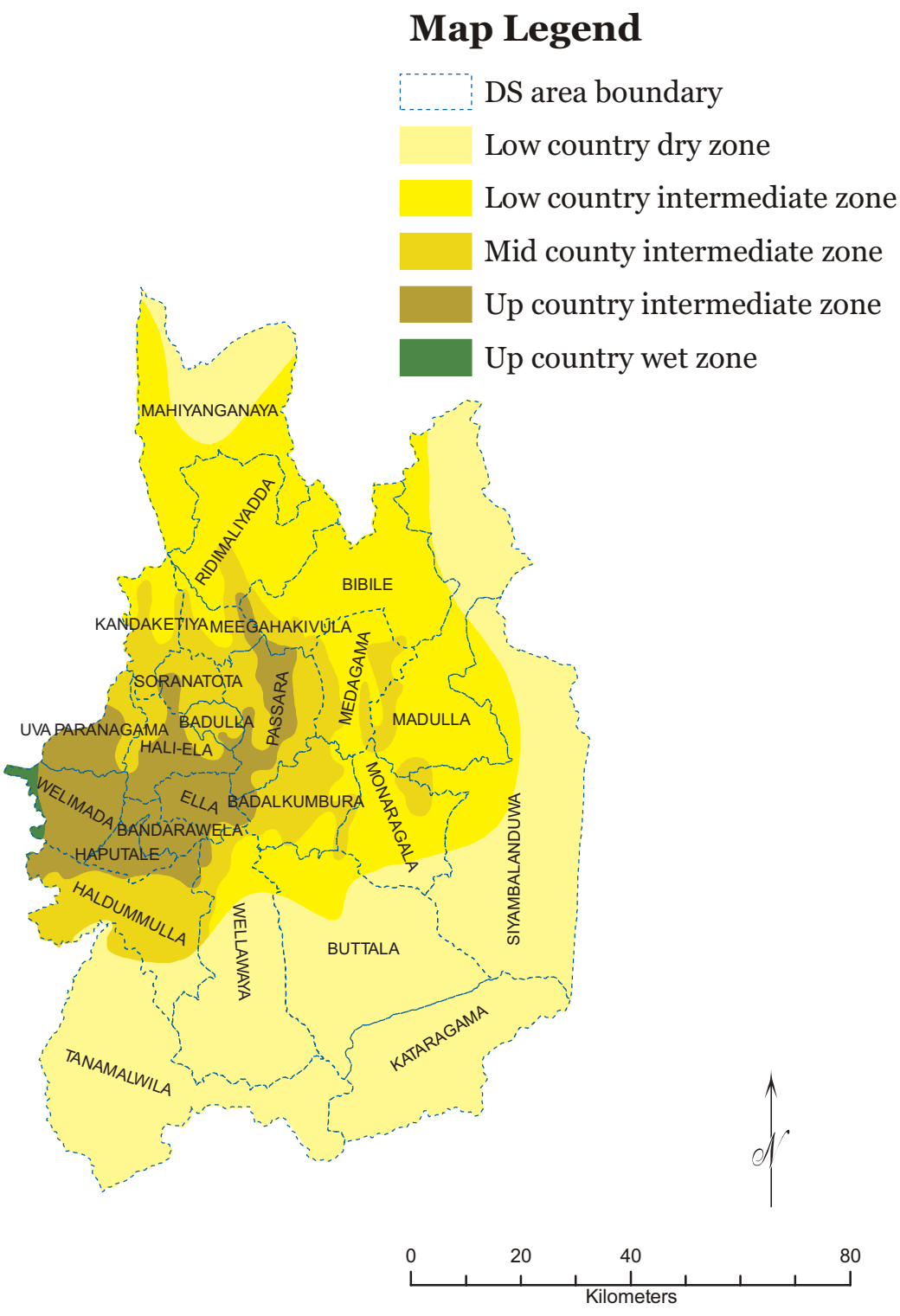
5.2 Central Province



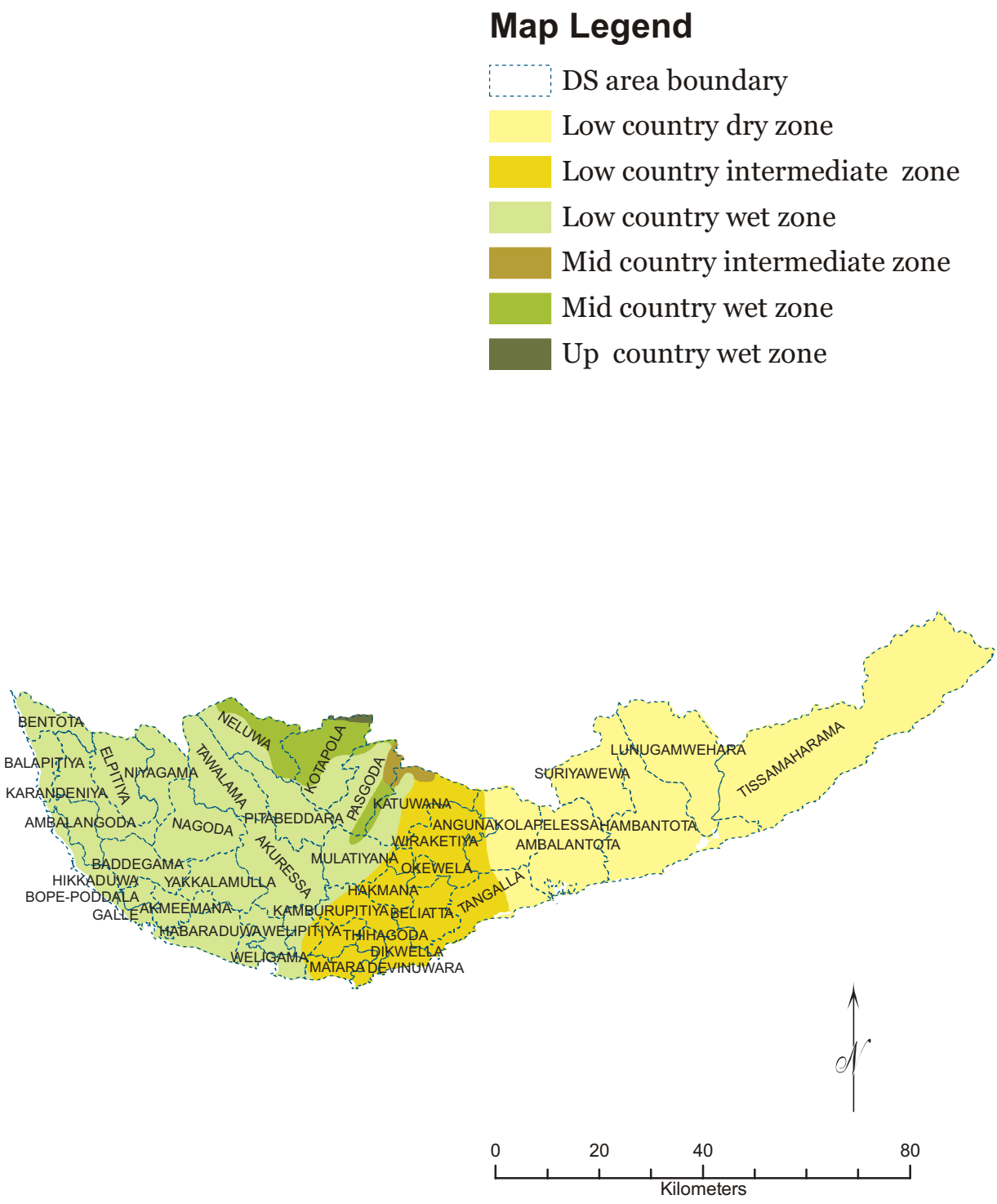
5.3 Sabaragamuwa Province



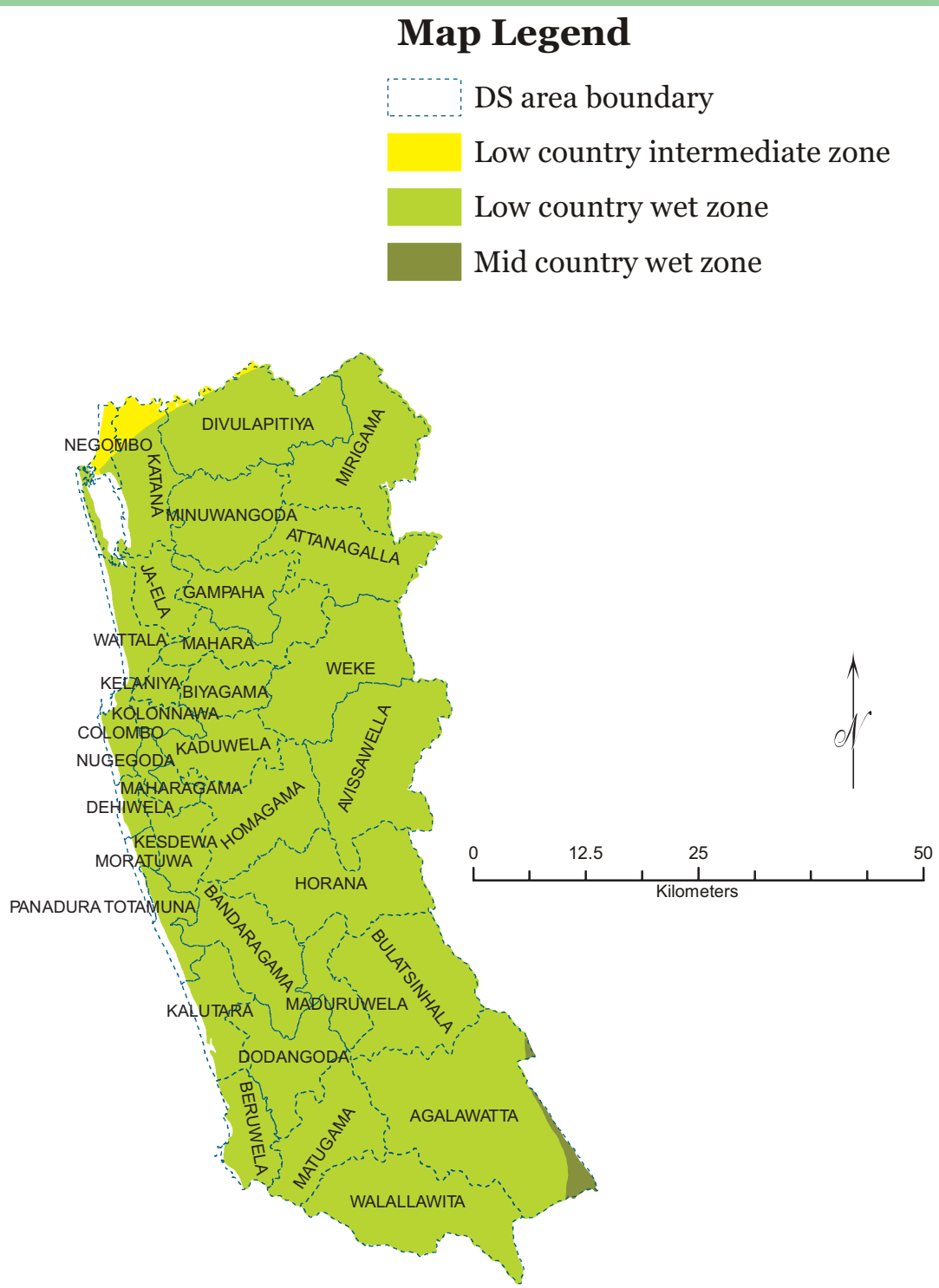
5.4 Uva Province



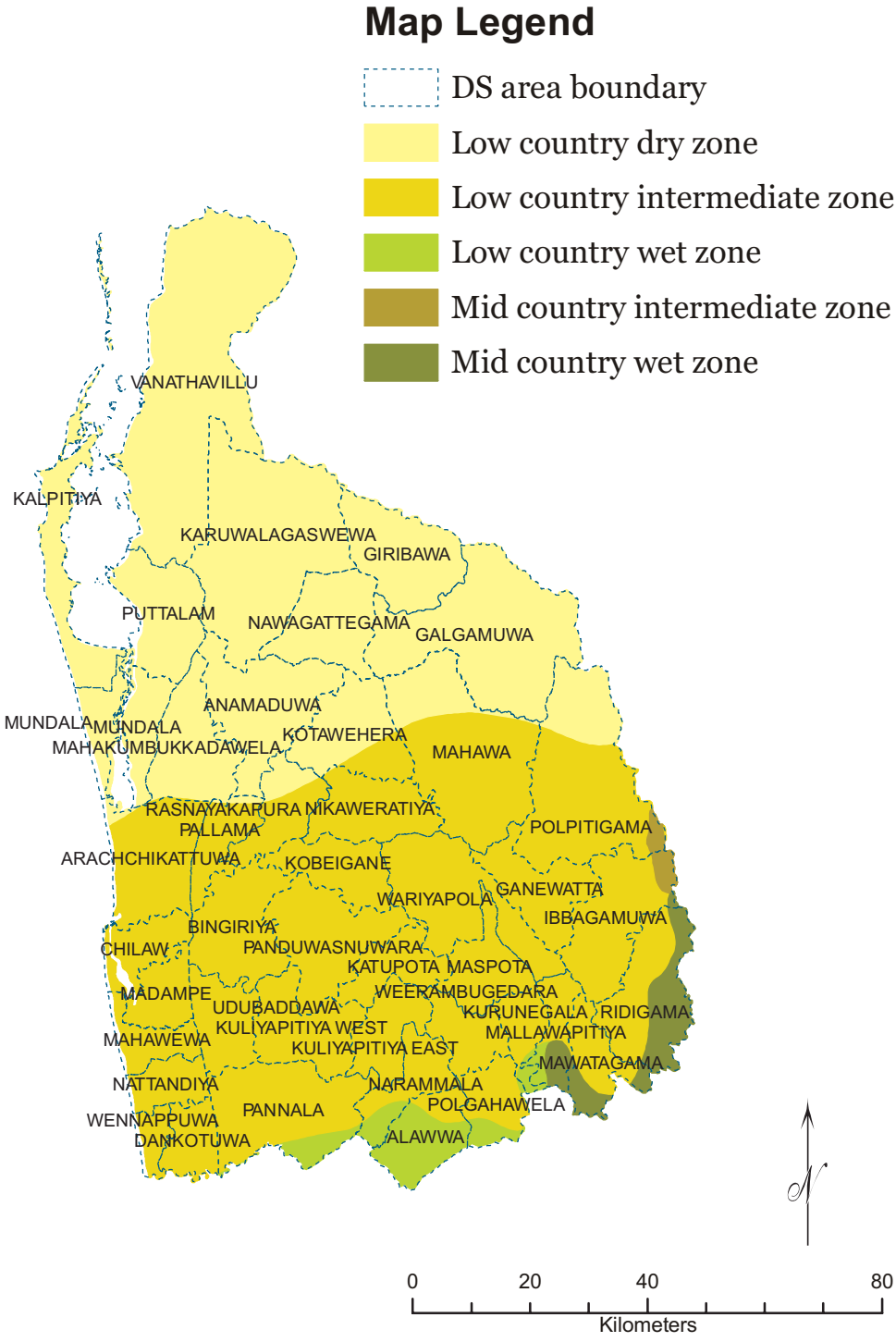
5.5 Southern Province



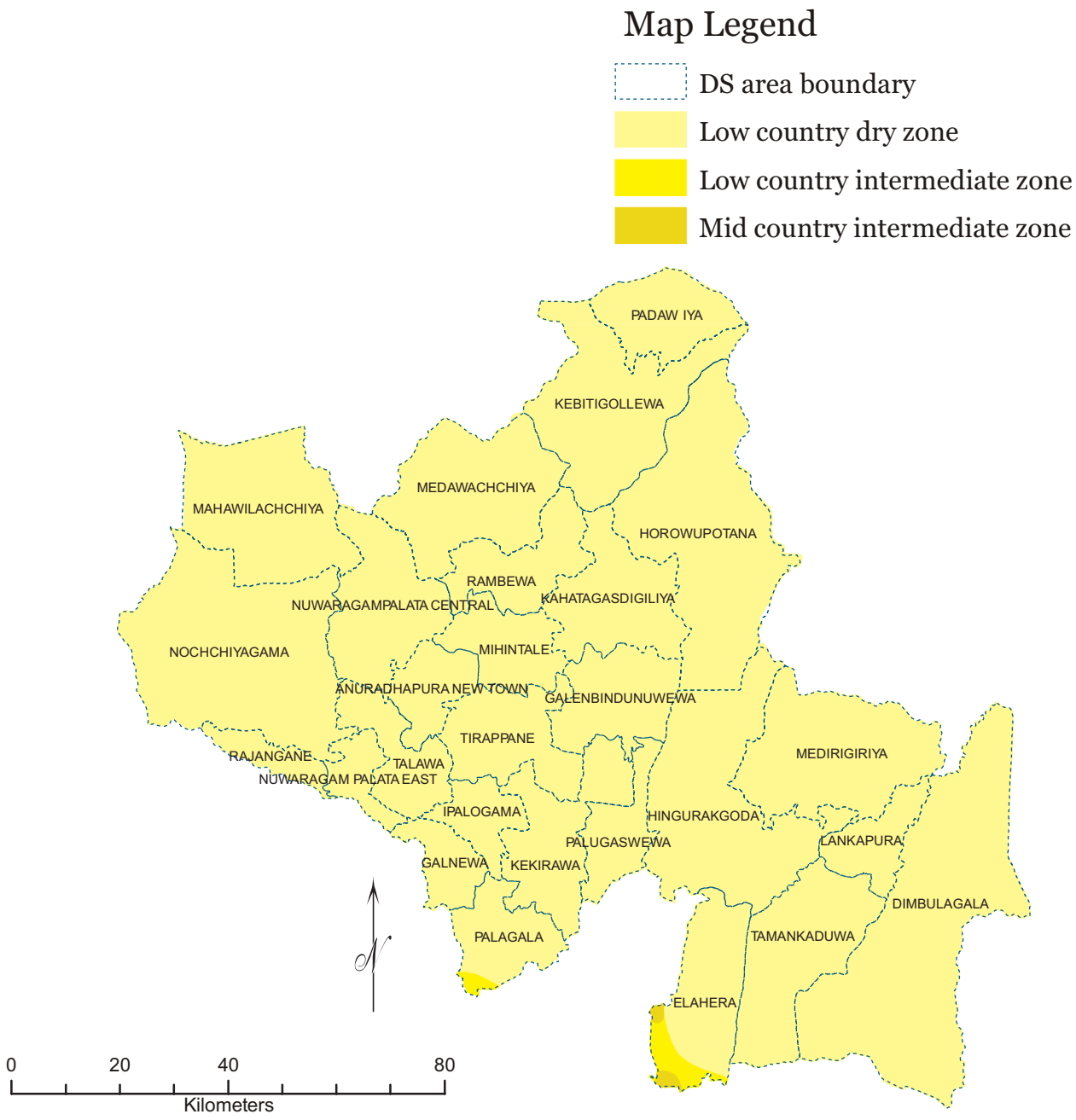
5.6 Western Province



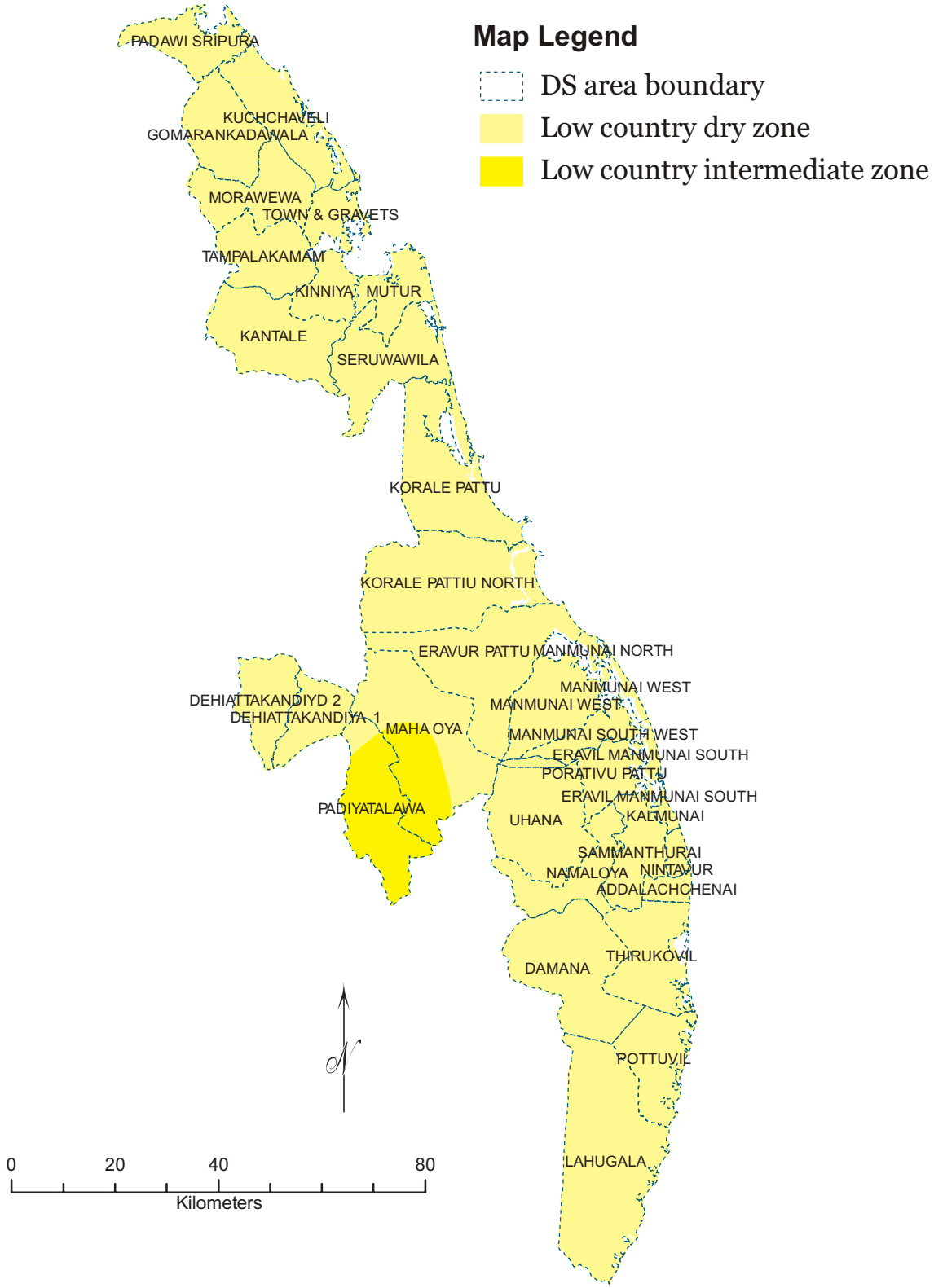
5.7 North - Western Province



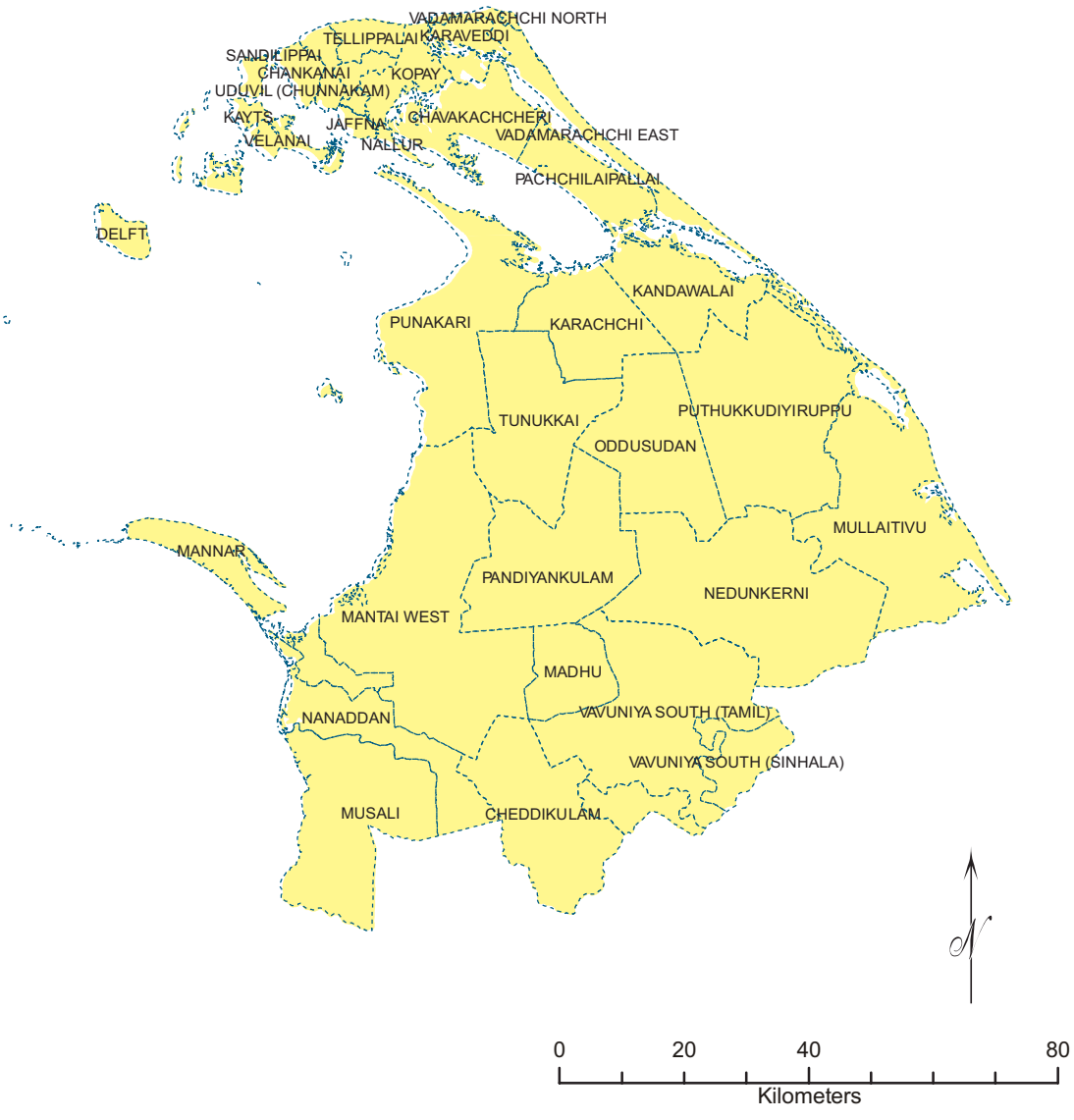
5.8 North - Central Province



5.9 Eastern Province



5.10 Northern Province



5.11 Salient Features of Agroclimatic Zones

	Up country		Mid country		Low country		
	Wet Zone	Intermediate Zone	Wet Zone	Intermediate zone	Wet Zone	Intermediate zone	Dry Zone
Elevation(m)	>1200	>1200	450-1200	450 -1200	0-450	0-450	0-450
Ambient temperature C^0	10-18	18-24	21-32	25-32	24-35	25 32	21-38
Rain fall(mm)	>2000	1750 - 2000	1875 - 5000	1750 - 2500	1875 - 2500	1000-1750	1000 -1750
Relative humidity (%)	58-75	58-75	55 - 75	55 - 75	75 - 90	60 - 80	70- 85
Predominant type of farmers	Plantation workers	Plantation workers/ Crop farmers	Crop farmers	Crop farmers	Coconut land owners/ Crop farmers	Coconut land owners/ Crop farmers	Crop farmers
Typical fodder and pasture base	Road sides, Ravines or Established pasture	Road sides, Ravines or Established pasture	Road sides or Established pasture	Road sides, Crop fields or Established pasture	Post harvest crop fields or Established pasture	Under coconut, post harvest crop fields or established pasture	Post harvest crop fields tank beds & scrub jungles
Predominant Type of cattle	Temperate & Temperate crosses	Temperate & Temperate crosses	Temperate crosses	Temperate crosses	Zebu or zebu crosses	Lanka & zebu crosses	Lanka & Lanka zebu crosses
Typical average herd size of cattle	2-5	2-5	2-5	2 8	2 10	5 - 20	25 - 100

6. Cattle Breeding

6.1 Cattle Breeding in the Field

6.1.1 UP Country Wet Zone

Breeding Objective	To produce a dairy type animal
Breeding Policy	Grading up using temperate breeds of cattle
Breeding Strategy	Breeding strategy is defined separately for different farming systems found in the area

Farming system/ Breeding Strategy	Recommended breeds for upgrading	Target Lactation	Remarks
A) <u>Intensive system</u> Continuous grading up of existing cattle using temperate breeds of cattle viz. Use a temperate breed to produce F1 generation, which will have 50% temperate blood level. F1 is backcrossed (same temperate breed) to produce B1, which will have 75% temperate blood level. B1 is again backcrossed (to same temperate breed) to produce B2, which will have 87.5% temperate blood level. This process will be continued to raise the temperate blood level (Annexure I).	Friesian Ayrshire Jersey	>4500 >4000 > 3500	Friesians and Ayrshires are known to give more milk whereas the Jerseys have a higher fat content
B) <u>Semi-Intensive system</u> Grading up of existing cattle using temperate breeds of cattle (Annexure I)	Friesian Ayrshire Jersey	> 3500 > 3250 > 3000	Same as above

6.1.2 Up Country Intermediate Zone

Breeding Objective	To produce a dairy type animal
Breeding Policy	Grading up using temperate breeds of cattle
Breeding Strategy	Breeding strategy is defined separately for different farming systems found in the area. Prominent extensive system is not found in the Up Country Intermediate Zone

Farming system/ Breeding Strategy	Recommended breeds for upgrading	Target Lactation	Remarks
A) <u>Intensive system</u> Grading up of existing cattle using temperate breeds of cattle (Annexure I)	Friesian Ayrshire Jersey	> 3500 > 3250 > 3000	Friesians and Ayrshires are known to give more milk whereas the Jerseys have a higher fat content in milk.
B) <u>Semi-intensive system</u> Grading up of existing cattle using temperate breeds of cattle (Annexure I)	Friesian Ayrshire Jersey	> 3250 > 3000 > 2750	Jersey breed can tolerate tropical conditions better than Friesians and Ayrshires

6.1.3 Mid Country Wet Zone

Breeding Objective	To produce a dairy type animal
Breeding Policy	Grading up using temperate breeds of cattle
Breeding Strategy	Breeding strategy is defined separately for different farming systems found in the area. Prominent extensive system is not found in the Mid Country Wet Zone

Farming system/ Breeding Strategy	Recommended Breeds for upgrading	Target Lactation	Remarks
A) <u>Intensive system</u> Continuous grading up of existing cattle using temperate breeds of cattle. (Annexure I)	Friesian Ayrshire Jersey	>3500 >3250 >3000	Best growth rate is obtained with the Friesians while Jerseys have a higher fat content in milk.
B) <u>Semi-Intensive system</u> Continuous grading up using Jersey breed (Annexure I) Grading up of using Friesians/Ayrshires to 75% blood level. The breeding bulls with 75% blood level will be produced in breeder farms. - Use Friesian and Ayrshire breed to produce F_1. F_1 is backcrossed to produce B_1 which will have 75% level of temperate blood. These bulls will be used for upgrading. (Annexure II).	Jersey Friesian or Ayrshire	> 2500 > 2750	Jersey breed can tolerate tropical conditions better than Friesians and Ayrshires Ayrshire breed is preferred over Friesian due to lower cost of management.

6.1.4 Mid Country Intermediate Zone

Breeding Objective	To produce a dairy type animal
Breeding Policy	Grading up using temperate breeds of cattle
Breeding Strategy	Breeding strategy is defined separately for different farming systems found in the area

Farming system/ Breeding Strategy	Recommended Breeds for upgrading	Target Lactation	Remarks
A) <u>Intensive system</u> Continuous grading up of existing cattle using temperate breeds of cattle (Annexure I).	Friesian Ayrshire Jersey	> 3500 > 3000 > 3000	Higher milk production is obtained with the Friesians and Ayrshires while Jerseys have a higher fat content in milk.
B) <u>Semi-Intensive system</u> Grading up using temperate breeds to 50% blood level. The breeding bulls with 50% blood level will be produced in breeder farms. Use temperate breeds to produce F_1, which will have 50% temperate blood level. These bulls will be used in upgrading the existing herds (Annexure III).	Friesian Jersey Ayrshire AFS	> 2000	Australian Friesian Sahiwal (AFS) has been bred for milk and it could be used straight away for upgrading purpose Friesian, Ayrshire and Jersey crosses have shown promising results under semi-intensive system
C) <u>Extensive system</u> Grading up of existing cattle using temperate X zebu 50% crossbred bulls (Annexure III) or continuous grading up using a zebu breed (Annexure I).	Jersey Sahiwal	> 1500 > 1250	Jersey x Sahiwal crosses can produce higher milk yield under tropical weather conditions

6.1.5 Low Country Wet Zone

Breeding Objective	To produce a dairy type animal
Breeding Policy	Grading up using exotic breeds of cattle
Breeding Strategy	Breeding strategy is defined separately for different Farming systems found in the area

Farming system/ Breeding Strategy	Recommended Breeds for upgrading	Target Lactation	Remarks
A) <u>Intensive system</u> Continuous grading up of existing cattle using temperate breeds of cattle (Annexure I).	Friesian Ayrshire Jersey	> 3000 > 2750 > 2500	This recommendation is for very high standard of management conditions. High milk production is obtained with the Friesian and Ayrshire breeds while Jersey breed has a higher fat content in milk.
B) <u>Semi-Intensive system</u> Grading up of existing cattle using a temperate breed to 50% blood level (Annexure III).	Jersey Friesian Ayrshire	> 1500	Temperate crosses produce higher milk yield under this climatic and management condition.
C) <u>Extensive system</u> Continuous grading up of existing cattle using zebu breeds of cattle (Annexure I).	Sahiwal	> 1250	Sahiwal is a tropical dairy breed thriving well under this climatic and management condition.

6.1.6 Low Country Intermediate Zone

Breeding Objective	To produce a dairy dominant dual type animal
Breeding Policy	Grading up using exotic breeds of cattle
Breeding Strategy	Breeding strategy is defined separately for different farming systems found in the area

Farming system/ Breeding Strategy	Recommended Breeds for upgrading	Target Lactation	Remarks
A) <u>Intensive system</u> Continuous grading up of existing cattle using temperate breeds of cattle (Annexure I).	Friesian Ayrshire Jersey AFS	> 3000 > 2750 > 2500 > 2500	This recommendation is for very high standard of management conditions. High milk production is obtained with the Friesian and Ayrshire breeds while Jersey breed has a higher fat content in milk.
B) <u>Semi-Intensive system</u> Grading up using a temperate breed to 50% blood level. The breeding bulls with 50% blood level will be produced in breeder farms. Use a temperate breed to produce F_1 which will have 50% temperate blood level. These bulls will be used in upgrading the existing herds (Annexure III).	Ayrshire Jersey AFS Sahiwal	> 1500	Temperate crosses produce higher milk yield under this climatic and management condition.
C) <u>Extensive system</u> Grading up of existing cattle using temperate X zebu 50% crossbred bulls (Annexure III) or continuous grading up using a zebu breed (Annexure I).	Sahiwal	> 1250	Sahiwal is a tropical dairy breed thriving well under this climatic and management condition.

6.1.7 Low Country Dry Zone

Breeding Objective	To produce a dairy dominant dual type animal
Breeding Policy	Grading up using exotic breeds of cattle
Breeding Strategy	Breeding strategy is defined separately for different farming systems found in the area

Farming system/ Breeding Strategy	Recommended Breeds for upgrading	Target Lactation	Remarks
A) <u>Intensive system</u> Grading up of existing cattle using a temperate breed to 50% exotic blood level (Annexure III).	Ayrshire Jersey	> 1750 > 1500	If the management conditions are really good the temperate blood level could be raised up to 100%.
B) <u>Semi -Intensive system</u> Continuous grading up of existing cattle using a Zebu Breed (Annexure I) or Grading up of existing cattle using a temperate breed to 50% blood level (Annexure III).	AFS Jersey Sahiwal	> 1750 > 1500 > 1250	Sahiwal is a tropical dairy breed which could thrive well under intermediate, semi intensive management conditions. Jersey crosses produce a higher milk yield under tropical weather conditions. AFS could be used straight away until the recommended quality F_1 sires are made available locally.
C) <u>Extensive system</u> Continuous grading up of existing cattle using a Zebu breeds of cattle (Annexure I.)	Sahiwal	> 1200	Sahiwal is a tropical dairy breed which could thrive well under this climatic and management conditions.

6.2 Cattle Breeding in the Nucleus Farms

There should be organizations and/or institutions to supply the recommended pure and crossbred breeding bulls of different genetic make up for different breeding schemes. At national level the supply of sires of different genetic composition is the responsibility of the NLDB. Breeding schedule for the nucleus farms is shown below.

Breeds	Recommendation	Farm	Organization	Zone
Friesian	To be maintained pure	Bopaththalawa	NLDB	Up Country Wet zone
		New Zealand Farm	Lanka Dairies*	
Ayrshire	To be maintained pure	Ambewela	Lanka Dairies*	
Jersey	To be maintained pure	Dayagama	NLDB	
		Andigama	NLDB	Low country Dry / Intermediate zones
Sahiwal	To be maintained pure	Nikaweratiya Galpokuna Polonnaruwa	NLDB	
Temperate X Zebu Crosses	To be maintained at 50% or 75% temperate blood levels	All the farms with Temperate X Zebu crosses	NLDB	

In addition to the large scale nucleus farms, the superior genetic resources available in medium and small scale private sector farms should also be harnessed (open nucleus breeding system) in the national level breeding program.

* Lanka Dairies being the largest private sector organization maintaining two purebred Ayrshire and Friesian nucleus farms in the up country; namely Ambewela and New Zealand farms respectively is expected to actively participate in providing breeding materials for implementation of the breeding policy guidelines.

7. Buffalo Breeding

7.1 Buffalo Breeding in the Field

7.1.1 Whole Country

Breeding Objective	To produce a high yielding dairy or dairy dominant dual type buffalo
Breeding Policy	Grading up of existing herds using exotic breeds of buffaloes
Breeding Strategy	Breeding strategy is common for all of the farming systems existing in the country

Farming system/ Breeding Strategy	Recommended breeds	Target Lactation (Lit.)	Remarks
Intensive/Semi-intensive or Extensive systems Continuous grading up of existing buffalo using a recommended exotic breed (Annexure I).	Murrah Nili-Ravi	>2800 >2800	If draught power is required pure or 50% crossbred Lanka Buffaloes could be maintained.

Wherever possible Artificial Insemination is recommended for the maintenance of pure breeds and grading up process in the field. The required types of semen are either produced at the Central Artificial Insemination Station (CAIS) in Kundasale and at the Artificial Insemination Station at Polonnaruwa or imported from the relevant countries as and when required. Natural Breeding will be practiced in the areas where extensive management systems is common and in the areas where AI service is difficult.

7.2 Buffalo Breeding in the Nucleus Farms

Breeds	Recommendation	Farm	Zone	Organization
Murrah	To be maintained pure	Polonnaruwa	Low country Dry Zone	NLDB
Nili-Ravi	To be maintained pure	Nikawaratiya	Low country intermediat Zone	
Crossbred buffaloes	To be graded up to Murrah or Nili-Ravi depending on the predominant breed available	Haragama	Mid country Intermediate zone	
		Melsiripura	Low country intermediate Zone	
		Martin Farm	Low country intermediate Zone	
		Marandawila	Low country intermediate Zone	
		Ridiyagama	Low Country Dry Zone	

8. Goat Breeding

8.1 Goat Breeding in the Field

8.1.1 Up Country Wet Zone

Breeding Objective	To produce a dairy type goat.
Breeding Policy	Grading up of existing herds using exotic Dairy breeds of goats.
Breeding Strategy	Breeding strategy is common for all farming systems

Farming system/ Breeding Strategy	Recommended breeds	Remarks
Intensive and semi - intensive systems Continuous grading up of existing goats using a recommended exotic breed (Annexure I).	Saanen	Saanen is recommended for the climatic conditions prevailing in the Up country area.

8.1.2 Up Country Intermediate Zone

Breeding Objective	To produce a dairy dominated dual type goat
Breeding Policy	Grading up using exotic breeds of goats
Breeding Strategy	Breeding strategy is common for all farming systems

Farming system/ Breeding Strategy	Recommended breeds	Remarks
Intensive and semi- intensive systems Continuous grading up of existing goats using a recommended exotic breed (Annexure I).	Saanen Jamnapari	Saanen is a dairy breed where asJamnapari is considered as a dual type breed.

8.1.3 Mid Country and Low Country

Breeding Objective	To produce a dairy dominant dual type goat
Breeding Policy	Grading up using exotic breeds of goats
Breeding Strategy	Breeding strategy will depend on the farming system

Farming system / Breeding Strategy	Recommended breeds	Remarks
A) <u>Intensive System</u> Continuous grading up of existing goats using a recommended exotic breed (Annexure I).	Saanen Jamnapari	Saanen is a dairy breed whereas Jamnapari is considered as a dual purpose breed.
B) <u>Semi Intensive and extensive systems</u> Continuous grading up of existing goats using a recommended exotic breed (Annexure I).	Jamnapari	

Wherever possible Artificial Insemination is recommended for the maintenance of pure breeds and grading up process in the field.The required types of semen are either produced locally or imported from the relevant countries as and when required. Natural breeding will be practiced in the areas where extensive management systems is common and in the areas where AI service is difficult.

8.2 Goat Breeding in the Nucleus Farms

There should be nucleus farms maintained by the government or private sector organizations and/or institutions to supply the recommended pure and crossbred breeding stock of different genetic make up for different breeding schemes. Breeding schedule for the nucleus farms is shown below. NLDB is the main state organization to maintain nucleus herds to supply high quality breeding animals.

Breeds	Recommendation	Farm	Organization	Zone
Saanen	To be maintained pure	New Zealand Farm	Lanka Dairies (Pvt.)Ltd.*	Up Country
		Bopaththalawa	NLDB	
		Mahaberiyatenna		Mid Country
Jamnapari	To be maintained pure	Thelahera	DAPH	Low Country Intermediate Zone
		Imbulandanda		Mid Country
Jamnapari crosses	To be graded up to Jamnapari level	Helamada	NLDB	Low Country Wet Zone

* Lanka Dairies (Pvt)Ltd. being the largest private sector organization maintaining a purebred Saanen herd in the up country is expected to actively participate in providing breeding materials for implementation of the breeding policy guidelines.

9. Sheep Breeding

9.1 Sheep Breeding in the Field

9.1.1 Whole Country

Breeding Objective	To produce a meat type sheep
Breeding Policy	Grading up using exotic breeds
Breeding Strategy	Breeding strategy is common for all farming systems

Farming system/ Breeding Strategy	Recommended breeds	Remarks
Intensive, semi-intensive and extensive systems Continuous grading up of existing sheep to exotic level (Annexure I).	Red Madras Bannur	Bannur is the preferred breed for meat production and Red Madras shows a better adaptability to local conditions. Red madras is the most available breed at the moment.

9.2 Sheep Breeding in the Nucleus Farms

NLDB is the main organization to maintain nucleus herds to supply high quality breeding animals.

Breeds	Recommendation	Farm	Organization	Zone
Red Madras and Bannur crosses	To be graded up to 100% Red Madras level	Horakele	NLDB	Low country intermediate Zone
Red Madras and Bannur crosses	To be graded up to 100% Bannur level	Rukattana		
		Andigama		

10. Pig Breeding

10.1 Pig Breeding in the Field

10.1.1 Whole Country

Breeding Objective	To produce a fast growing commercial pig
Breeding Policy	Maintain the existing exotic breeds of pigs and to produce suitable commercial pig
Breeding Strategy	Cross Breeding (Two-way or Three-way) for commercial production

Farming system/ Breeding Strategy	Recommended breeds	Remarks
Intensive system To produce two-way or three-way fattener pigs.	Landrace Large White Duroc	The two-way commercial pig would be the cross between Landrace and Large White or vice-versa (Annexure IV). Three-way cross is produced by crossing the crossbred gilts (Large White X Landrace or reciprocals) to Duroc as a terminal sire (Annexure IV).

10.2 Pig Breeding in the Nucleus Farms

NLDB is the main organization to maintain nucleus herds to supply high quality breeding animals.

Breeds	Recommendation	Farm	Organization	Zone
Landrace	To be maintained pure	Welisara	NLDB	Low country Wet Zone
		Horakele		Low country Intermediate Zone
Large White	To be maintained pure	Welisara		Low country Wet Zone
		Horakele		Low country Intermediate Zone
Duroc	To be maintained pure	Welisara		Low country Wet Zone

* In addition to above state farms, large scale private breeder farms also shall maintain pure lines of above breeds

11. Indigenous Livestock

11.1 Breeding of Indigenous Livestock

Breeding Objective	To conserve (In-situ and/or Ex-situ) the indigenous livestock breeds
Breeding Policy	Maintain the existing indigenous breeds of livestock
Breeding Strategy	Pure Breeding or cryo-preservation of sperm, embryos, oocytes or somatic cells for future use

Breeds	Location	Recommendation	Farm/Zone	Organization
Lanka cattle	Isolated pockets	In-situ and/or Ex-situ conservation by pure breeding or Ex-situ conservation by appropriate technologies	At the locations they are found or at any other appropriate locations	DAPH, NLDB, Universities, NGOs or any other public or private organizations
White cattle	Eastern Province			
Lanka buffalo	Isolated pockets			
Indigenous goat	Isolated pockets			
Kottukachchiya goat	Puttalam District			
Indigenous Pig	Western coast			
Jaffna local Sheep	Jaffna Peninsula			

Conservation of indigenous livestock species should be in accordance with the Global Plan of Action for Animal Genetic Resources which includes following four main strategic priority areas.

A. Characterization, Inventorying and Monitoring
B. Policies, Institutions and Capacity building
C. Conservation
D. Sustainable use and Development

11.2 SomeFacts About Indigenous Livestock in Sri Lanka

Lanka Cattle

These are compact non-descript local cattle found in isolated pockets of Sri Lanka. The predominant colours are dark tan and black with a shiny short coat. They are well adapted to the harsh environment. Although the indigenous cattle are poor producers they are highly prolific in nature. Indigenous cattle do not have a prominent hump, a dewlap or an umbilical fold. According to the body conformation and the barrel shape body, the indigenous cattle appear to be a meat type animal.

White Cattle

These animals are mainly found in the Eastern province of Sri Lanka and can be easily differentiated from all other cattle breeds in the country due to their white coat colour and tall, thin body shape. It is also believed that these animals were developed through cross breeding by using Indian dairy breeds such as Tharpakar and Hariyana and draught breeds such as Khilari and Kangayam. However these animals are now mainly used for draught and meat production.

Lanka Buffaloes

The Lanka buffaloes of Sri Lanka are phenotypically very much similar to the swamp type buffaloes and they are easily distinguished from the river type by their appearance. But they are genetically similar to the river type and possess 50 chromosomes. There are several phenotypes of Lankan buffaloes such as Thamankaduwa, Walawe, Kothmale and Southern which are named according to the location they are found in Sri Lanka. Body size and colour variation among the different phenotypes can be seen. The predominant body colour is dark grey with whitish stockings. Lanka buffaloes have short stocky body with short legs. They have well grown sickle shaped horns.

Indigenous Goat

Majority of the goats in Sri Lanka belongs to indigenous type. They are small and exhibit poor milk production compared to the exotic breeds. These goats are mainly restricted to remote, rural areas and mainly used for meat. It is a hardy animal with high prolificacy. The small body size, short ears and tiny pointed face with short horns are the main characteristics of the breed. The predominant colours are white,tan, black or a mixture of any of those colors.

Kottukachchiya Goat

Kottukachchiya goat is the only characterized local goat breed in Sri Lanka. This breed was originated from animals imported from India in early 60's and was developed at Kottukachchiya farm. They are black in colour with a shiny short coat. Both males and females are horned. It has long legs, and medium sized drooping ears. Kottukachchiya breed is highly adapted to harsh climatic conditions and perform well under local management conditions. Due to indiscriminate crossbreeding, Kottukachchiya goat is on the verge of extinction.

Indigenous Pig

Due to the small body size, these are also known as Mini Pigs. The predominant body color is blackish grey. They have tapering face, longer snout compared to the rest of the body and long body hair. They prefer to wallow in mud. These are mainly reared as scavenging animals and are a very important component in extensive pig management system.

Jaffna Local Sheep

Jaffna local sheep is the only native sheep breed in Sri Lanka. These small sized sheep are found only in the Northern part of Sri Lanka. The predominant colors are brown and white with different degree of mixing. The females are polled while the males may be either horned or polled. The ears are small.

12. Role of the State and Private Sector Agencies in Implementation of the Breeding Policy

Ministry of Livestock and Rural Community Development

- Development and implementation of policies, plans and programs of the livestock sector
- Provide relevant statutory provisions for the management and development of livestock sector
- Provide guidance and national level coordination on livestock breeding activities

The Department of Animal Production and Health

- Input supply for the AI service and natural breeding programme
- Monitoring and evaluation of the progress of breeding programs
- Organizing registration schemes for cattle
- Training in specialized techniques related to breeding programs
- Procurement and/or production of semen for artificial insemination
- Issue of semen and breeding animals
- Selection of bull calves from the nucleus farms for AI program
- Selection and issue of bull calves for natural breeding
- Monitoring the growth performances of selected bull calves
- Milk recording and progeny testing program
- Regulation of importation of animal genetics
- Introduction of herd recording schemes
- Research on Animal breeding and reproduction

The National Livestock Development Board

- Maintenance of nucleus farms with recommended breeds to produce
- pure and crossbred livestock for breeding
- Maintenance of performance testing stations for selected bull calves from field and farms
- Maintenance of performance and pedigree records
- Issue of breeding materials.

Provincial Department of Animal Production and Health

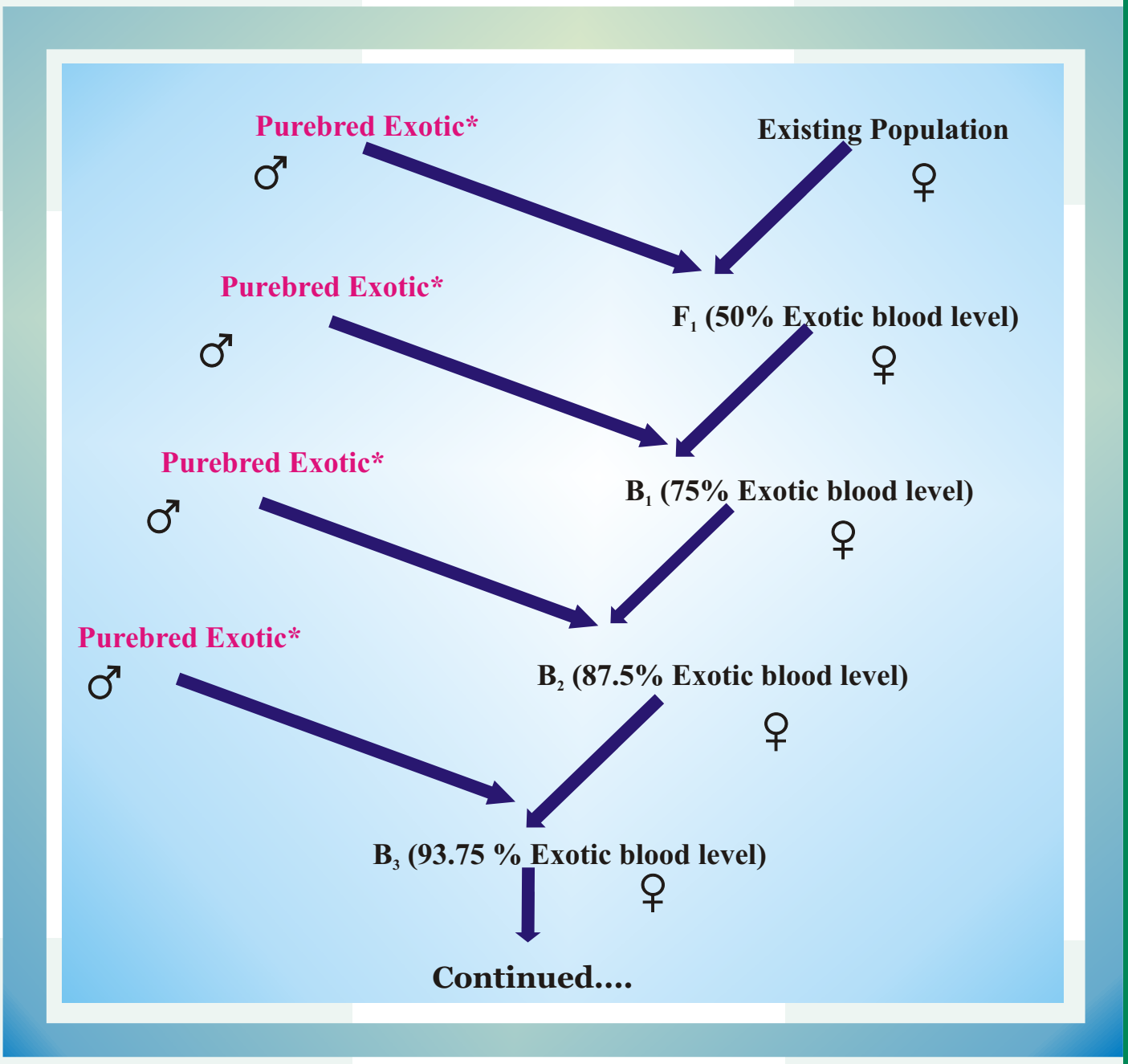
- Implementation of breeding policy and breeding programs
- Monitoring and evaluation of the projects and programs
- Data collection and follow up activities
- Issue of breeding materials
- Sustainable conservation of indigenous livestock
- Carry out AI service and follow up programme in the field

Universities, Non Governmental Organizations and other Private Sector Organizations

- Implementation of the breeding programs
- Maintenance of nucleus farms with recommended breeds
- Issue of breeding materials
- Implementation of herd recording schemes
- Training in specialized techniques related to breeding programs
- Assist in milk recording program
- Research on Animal breeding and reproduction

Annexure I

Continuous Grading up of Existing Population with Exotic Types

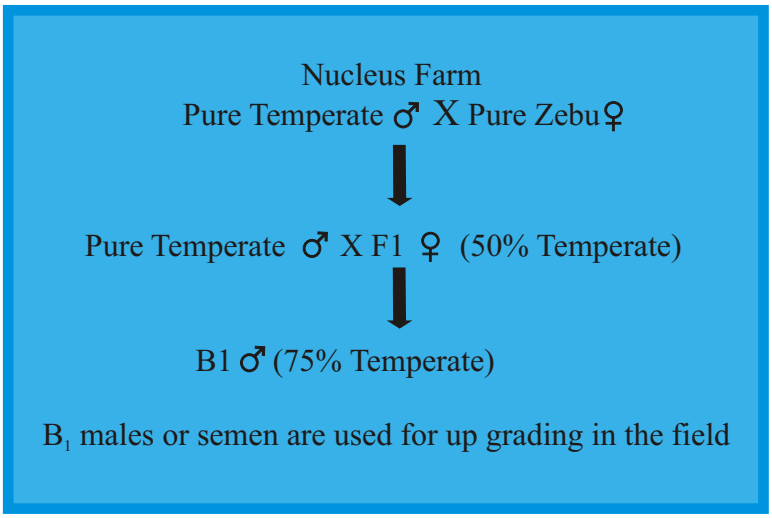


* Type of exotic breed depends on the type of the animals (cattle, buffalo, sheep, goat or swine) and the agro-climatic zone

Annexure II

Grading up of Existing Population with Exotic Breed up to 75% Blood Level

Production of males of 75% exotic blood level

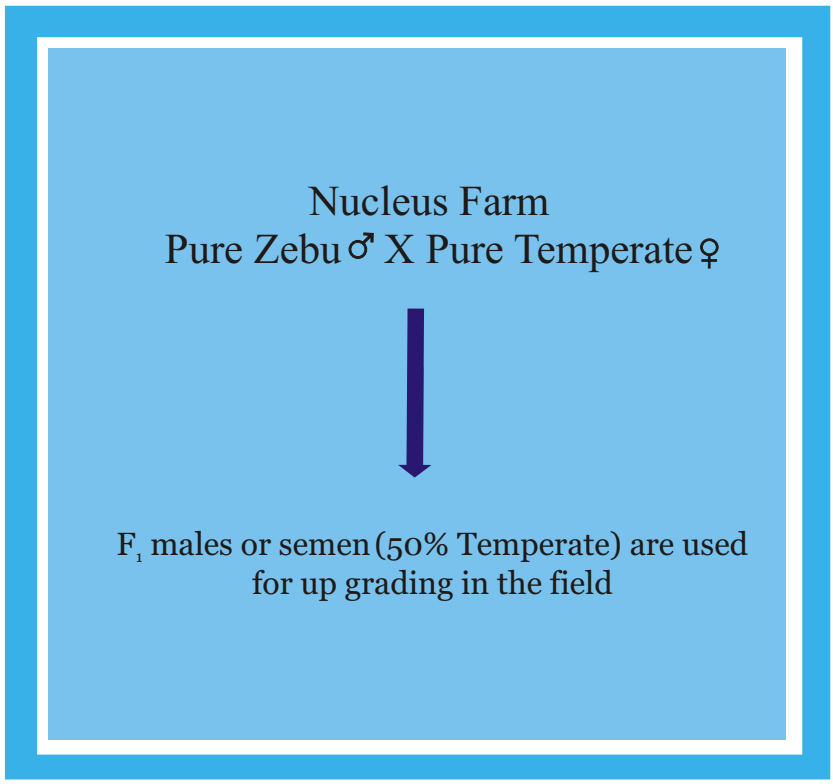


Grading up process up to 75% exotic blood level is similar to that is indicated in Annexure I, except that the B_1 (75% temperate) males are used instead of the purebred exotic males. Hence the temperate blood level in the F_1 generation will be 37.5%. It will be gradually increased in subsequent generations and finally established at 75% level in the population.

Annexure III

Grading up of Existing Population with Exotic Breed up to 50% Blood Level

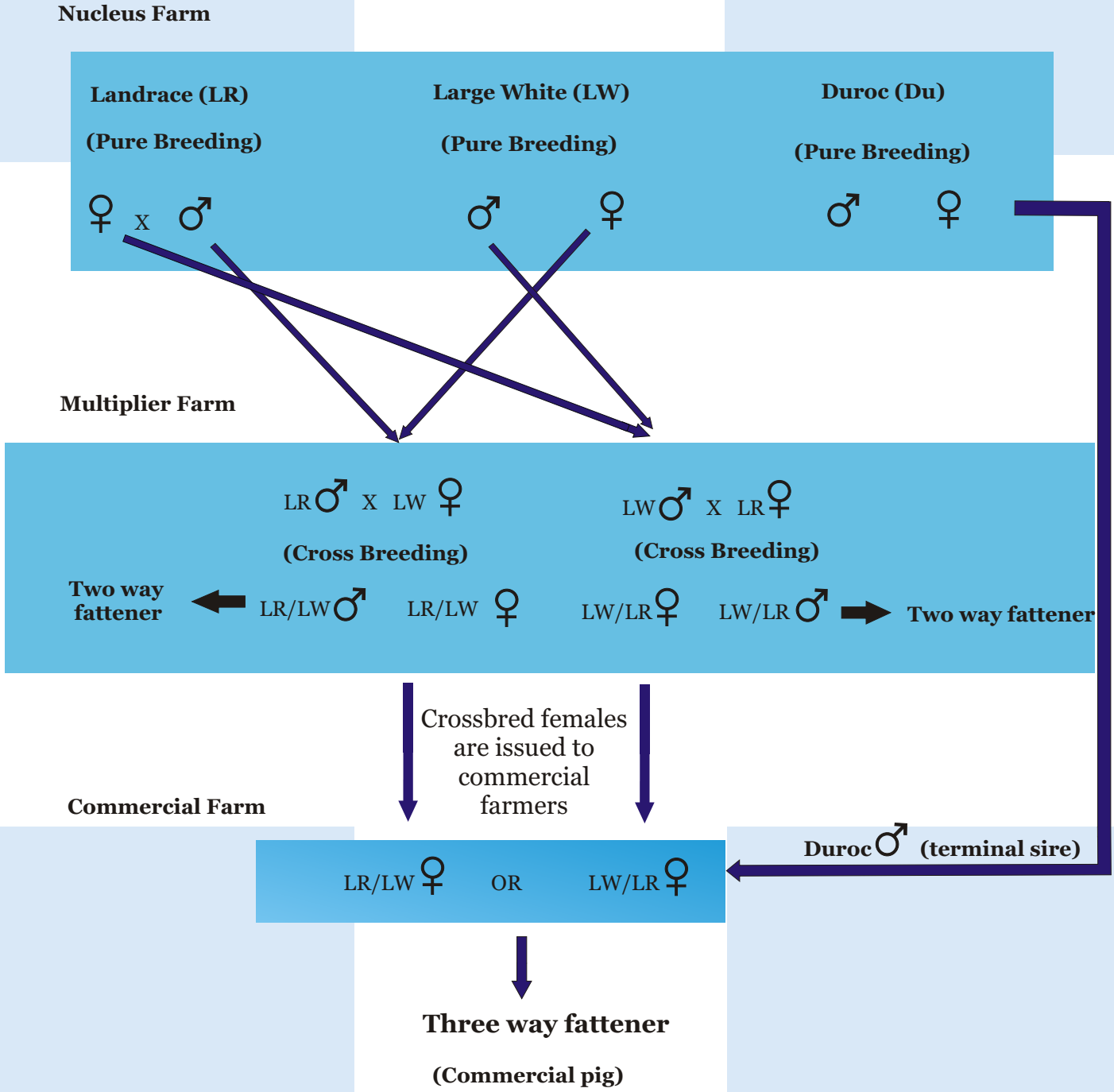
Production of males of 50% Temperate blood level



Grading up process up to 50% blood level is similar to that is indicated in Annexure I, except that the F_1 (50% Temperate) males are used instead of the purebred exotic males. Hence the temperate blood level in the F_1 generation will be 25 %. It will be gradually increased in subsequent generations and finally will be established at 50 % level in the population.

Annexure IV

Production of two way and three way Crossbred Pigs Under 3-tier System



Individual commercial farms can also maintain pure breeds and produce two way and three way crosses by themselves.

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