



**Rangelands, Forages,
Livestock, and Pastoralism**



International Centre for Integrated
Mountain Development

BIBLIOGRAPHY

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Bibliography on Rangelands, Forages, Livestock, and Pastoralism

**Documentation, Information and Training Service and
the Mountain Natural Resources' Division**

Preface

In response to the Regional Collaborative Programme, which is an ongoing four-year plan of programmes and activities at ICIMOD, and in order to foster dissemination of information related to various aspects of mountain development, the Library at ICIMOD has been bringing out annotated bibliographies on major issues affecting sustainable mountain development.

Previous bibliographies have covered subjects on Women in Mountain Development, Rural Development, Hydrology and Glaciology, Mountain Natural Resource Systems, and Biodiversity.

This Bibliography on Rangelands, Forages, Livestock, and Pastoralism includes 443 titles, all housed in the ICIMOD Library. Among these are monographs, articles from books and journals, and proceedings of seminars and workshops.

All references are arranged under specific fields of study: Rangelands --Ecology, Management and Development; Forage and Pasture Development; Tree Fodder, Agroforestry and Fodder Development; Livestock Production, Management and Development; and Pastoralism and Pastoral Development. They appear country-wise, beginning with countries from within the Hindu Kush-Himalayan Region.

Some documents and articles in Chinese have been listed, since there is an exchange with scholars working in the HKH Region, but for some of these titles, abstracts have not been provided because these documents do not have an English abstract insertion.

This bibliography has been prepared by Sangeeta Rajbhandari, under the supervision of Daniel Miller, Rangeland Specialist, Mountain Natural Resources Division of ICIMOD and with assistance from Raj Bahadur Shrestha, Librarian, ICIMOD.

In the citation of each abstract, the place names and project designations have been retained as published in the materials cited.

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Rangelands - Ecology, Management and Development

General

001 World Resources Institute / International Institute for Environment and Development. **Forests and rangelands.** In World Resources Institute/International Institute for Environment and Development. World resources 1988-89: an assessment of the resource base that supports the global economy with data tables for 140 countries. Washington, DC: World Resources Institute/London: International Institute for Environment and Development. 69-88p.

Keyword(s): Forest resources / Rangelands

Call No: R333.7 WOW

Lang: En

Forest and rangelands, which together cover about 84 per cent of the Earth's land surface, supply the basic products of wood, meat, and milk. Managing them sustainably is one of our greatest challenges. A prerequisite to sound management is thorough knowledge of the resource base. The study of resource management in developing countries is one with good intentions, but unsatisfactory results. This paper discusses forest resources of the world and rangelands of selected Asian countries. It also highlights the causes, rates, and trends of tropical deforestation and future trends in industrial wood production and trade. The rangeland conditions of China and Mongolia are discussed, especially the new and old approaches to rangeland management of Sub-Saharan Africa. Finally, recent developments in tropical forestry action plan and radioactive rangelands are discussed.

002 Bewes, J. W. 1984. **The world's grasses: their differentiation, distribution, economics and ecology.** New Delhi: Periodical Expert Book Agency. 408p.

Keyword(s): Plant ecology / Species / Grasses

Call No: 581.652 BEW

Lang: En

This book covers a very wide range of information regarding the grasses of the world. The work is mainly based on plant differentiation of the tribes and the genera. Emphasis has been laid throughout on facts of economic importance and on the ecology of grasslands. Morphology, taxonomy, phylogeny, distribution, economics, ecology, and physiology of the grasses are also given. In the first half of this book, the grasses and their behaviour is more or less confined to those of Great Britain and South Africa, but in the latter section most of the important genera of the world are reported with their distribution, ecology and economics.

003 Child, R. D.; Hady, H. F.; Peterson, R. A. 1987. **Arid and semiarid rangelands: guidelines for development.** Morrilton, AR: Winrock International Institute for Agricultural Development. 291p.

Keyword(s): Pasture management / Rangelands / Vegetation

Call No: 574.52643 CHA

Lang: En

This paper brings together some information on the structure and function of arid and semi-arid ecosystems, and the experience of past developmental efforts in developing countries. Although the coverage is worldwide, the emphasis is on Africa. This publication has been divided into four parts. A preview of these four parts is as follows: (a) ecosystem, (b) guidelines for natural resource development (c) guidelines for development of national/regional services and, (d) guidelines for programme planning and documentation. The first section describes the basic arid/semi-arid ecosystem and the importance of understanding the interrelations of the components of the system. The remaining three sections contain specific guidelines, in the form of stand-alone modules, in three of the more common areas of development activity. These common areas are: i) the natural resource base itself, ii) national and regional institutions that interact with the resource base through the human inhabitants of the ecosystem, and iii) the planning-assessment-monitoring process. Emphasis is given to the following six major components of a rangeland ecosystem: soils, microclimate, decomposers and microconsumers, vegetation, animal population, and people.

004 Curry-Lindahl, K. 1978. **Conservation problems of savannahs and other grasslands.** In Schofield, E. A. (ed.) Earthcare: global protection of natural areas - proceedings of the Fourteenth Biennial Wilderness Conference held on Apr 1978 at New York. 359-385p.

Keyword(s): Ecosystems / Grasslands / Nature conservation

Call No: 333.7 SCE

Lang: En

Today, most grassland habitats of the world are on marginal land. But such land has a value, provided, it is wisely used and managed instead of gradually destroyed. The great value of marginal lands is their productivity in the form of animals. This paper focusses on the conservation problems of savannahs and other grasslands. As the conservatism of agriculturalists, who are unwilling to recognise that animals, other than the few species hitherto domesticated, are a potential resource, is distressing. In this context, this paper defines the grasslands and presents the distribution patterns of grasslands,

discusses the deterioration and desertification of the world's grassland, and productivity of marginal grasslands. The problems of nomadic and semi-nomadic pastoralism in tropical grasslands is also discussed. Finally, management and utilisation of grassland ecosystem by implementing an action programme for grasslands is explained.

005 Muhammad Asghar. 1994. **Range management and forage production programmes in developing state.** Progressive farming 14(1):34-36

Keywords): *Rangelands / Developing countries / Food crops / Feed crops*

Call No: 631.05 PRF

Lang: En

'Range management' means essentially, the adoption of specific techniques for maximising the productivity of grazing lands. Grazing capacity has been decreased to a drastic extent below present potential of rangelands due to high pressure of unsystematic livestock grazing in developing countries. Therefore, range management and improvement practices are extremely important for developing countries. Major measures regarding range management and forage programmes in developing states is discussed in this paper with proper illustrations and recommendations.

006 Myers, N. 1978. **Wildlife of savannahs and grasslands: a common heritage of the global community.** In Schofield, E. A. (ed.) Earthcare: global protection of natural areas - proceedings of the Fourteenth Biennial Wilderness Conference held on Apr 1978 at New York. 385-409p.

Keyword(s): *National parks / Wildlife / Grasslands*

Call No: 333.7 SCE

Lang: En

Tropical savannahs, especially grasslands, are likely to be fundamentally modified. Some savannahs sustain the most spectacular array of large mammals left on earth. African grasslands, in particular, support exceptional throngs of wildlife. First part of this paper focusses on the savannah zones of the world with particular emphasis on the savannahs of Africa. Many of Africa's grasslands are being changed, with progressive impact. Three major activities modifying the grasslands in Africa are: livestock husbandry, anti-tsetse measures, and the spread of cultivation. The second part of this paper focusses on the 'common heritage' aspects of wildlife conservation. It attempts a preliminary exploration of the topic and seeks to ask some right questions, rather than to provide conclusive answers.

007 Olang, M. O. 1985. **Range monitoring methodologies.** In Kategile, J. A. (ed.) Pasture Improvement Research in Eastern and Southern Africa: proceedings of the workshop held on 17-21 Sep 1984 at Harare. Ottawa, Ont: International Development Research Centre. 452-464p.

Keyword(s): *Rangelands / Pastures*

Call No: 636.08551 KAP

Lang: En

There are various methods used in vegetation mapping, surveying, and monitoring. The methods include: aerial photography, satellite imagery interpretation, area frame sampling, step point, and the fixed transect method. Vegetation mapping and monitoring with the aid of aerial photographs is very expensive and slow. But the use of landset imagery in vegetation mapping is fast and relatively cheap. All these methods used for range monitoring have been discussed in this paper.

008 Ponce, S. L. (ed.) 1983 **The potential for water yield augmentation through forest and range management.** Bethesda, MD: American Water Resources Institute. [68]p.

Keyword(s): *Forest management / Rangelands / Water resources / Water management*

Call No: 551.48 POP

Lang: En

The potential for augmenting water yield by manipulating vegetation within a basin has intrigued hydrologists for decades. This edited volume includes papers which discuss the potential for water yield augmentation through forest and range management. The first five papers of this volume summarises the current knowledge about augmenting water yields by forest and range management practices in the U.S., Rocky Mountain and Intermountain west, Sierra Nevada, and western Oregon, and western Washington. Through the presentation of research results, the opportunities and limitations for augmenting water yields are discussed. Each author emphasises that although the greatest potential is on undisturbed watersheds, opportunities are restricted on a large-scale because of past management practice and land ownership. The sixth paper presents a provisional economic assessment of joint production of water and timber. The last paper summarises major issues associated with water yield augmentation by forest and range management practices. These include: (i) the problem of predicting increased yields from large basins, (ii) economic evaluation of additional flows, (iii) legal acceptance of and the need for system models, (iv) the legal question of ownership and transferability of increased yields, and (v) management emphasis on private and federal lands.

009 Rothermel, R. C. 1983. **How to predict the spread and intensity of forest and range fires.** Ogden, UT: U. S. Dep. of Agriculture. Intermountain Forest and Range Experiment Station. 161p.

Keyword(s): Forest fires / Fire control

Call No: 634.9618 ROH

Lang: En

This manual documents the procedures for estimating the rate of forward spread, intensity, flame length and size of fires burning in forests and rangelands. It contains instructions for obtaining fuel and weather data, calculating fire behaviour and interpreting the results for application to actual fire problems. Potential uses include fire prediction, fire planning, dispatching, prescribed fires, and monitoring managed fires. Additionally, this documents includes sections that deal with fuel model selection, fuel moisture, wind slope, calculations with monographs, TI-59 calculations, point source, line fire, interpretations of outputs and growth predictions.

Hindu Kush-Himalayan Region

010 Shah, B. H.; Rafique, S. M. 1989. **Regional seminar on problems affecting range and pastureland development in Himalayan region held on 19-26 November 1989 in Peshawar, Pakistan.** Peshawar: Pakistan Forest Inst. 221p.

Keyword(s): Pasture management / Himalayas / Land development / Rangelands

Call No: 333.74 SHR

Lang: En

The proceedings include 20 papers dealing with the problems, status of management and conservation of rangeland, and range and pasture improvement techniques. The volume also includes a section on conclusions and recommendations made during the seminar. In each country paper, emphasis is given to certain crucial aspects of range and pasture land problems and other practices in relation to livestock productivity in the area, followed by a required actionplan on national, regional, and international level.

Bhutan

011 Dunbor, G. A. 1979. **Alpine pastures, ecology and improvement.** Rome: FAO. 10p.

Keyword(s): Hills / Alpine ecosystem / Pastures / Ecology / Bhutan

Call No: 636.08551 DUA P

Lang: En

Vegetative conditions in pastoral areas in the

northwestern Bhutan are reported to be from fair to poor, reflecting very heavy use. Grasses constitute a relatively low proportion of the vegetable cover, over large areas. The provision of pasture or fodder for winter is reported to be a problem in all areas seen in Bhutan, although the cause of the problem varies in different parts of the country. This document thus, presents a concise report on alpine pastures and their ecology. Various features and programmes required for the conservation and improvement of pastures, based upon the visit made for the National Sheep and Yak Development Project.

China and the Tibetan Plateau

012 Jin Zhenzhou. 1986. **The characteristics and utilization of shrub-grasslands in tropical and subtropical mountains of Yunnan.** Acta phytocologica et geobotanica Sinica 10(2):81-89

Keyword(s): Grasslands / Land use / Hills / Ornamental shrubs / Vegetation / China, Yunnan

Call No: 574.5 ACP

Lang: Ch

013 Li Jinming. (ed.) 1988 **An atlas of rangeland and its main plant resources on the Qinghai, Tibet plateau.** Beijing: Agricultural Publishing House. 166p.

Keyword(s): Rangelands / Plant resources / China, Tibet

Call No: R 633.2 JIA

Lang: En

Qinghai is a part of the main body of the Qinghai-Tibet Plateau, which is contiguous to the Sichuan basin, the Hexi corridor, and the southern part of Xinjiang. It has a critical agro-ecological importance in the development of pasture-agronomy farming system. This atlas of rangeland is divided into three major parts. The first part covers the ecological environment of rangeland, which has been briefly described. The classes of rangeland is covered in the second part, each being described with a photograph. The main plant resources of rangeland is covered in the third part. Regarding these three topics, over 400 maps are illustrated in the Atlas. It also includes a collection of photographs of plant resources and different classes of rangeland describing the beauty of the Qinghai-Tibet Plateau. An index of Chinese and Latin names of plants are part of the Annex.

014 Li Shoude; Yang Ailian. 1993. **Strengthening nature preservation work in**

grassland for the improvement of ecological environment and the development of economy. In Chinese Academy of Sciences. Inst. of Botany. National parks and protected areas of east Asia: proceedings of the First Conference on National Parks and Protected Areas of East Asia and the Forty one working session of IUCN CNPPA held on 12-18 Sep 1993 at Beijing, China. Beijing: Chinese Academy of Sciences. Inst. of Botany. 166-172p.

Keyword(s): *Economic development / Nature reserves / Nature conservation / Grassland management*

Call No: 639.95 BON

Lang: En

Grassland of China covers a very large area which grows a thousand varieties of plants and have a thousand species of animals, among them are medicinal plants, top-quality pasture grasses, rare plants and animals and many precious livestock species. However, the natural resources in grasslands are being threatened by increasing pressure of human activities. The large area of grasslands is gradually depleting, and its biota is on the verge of destruction. Therefore, some of the valuable genetic resources have vanished from the grasslands. The situation tends to be worsening. This paper describes different measures taken for the strengthening of nature preservation work in grasslands of China for the improvement of ecological environment and the development of economy.

015 Liu Yuman. 1993. **Rangeland degradation in the pastoral region of China: causes and countermeasures.** In Longworth, J. W. (ed.) *Economic aspects of raw wool production and marketing in China.* (ACIAR technical reports, 25). Canberra, ACT: Australian Centre for International Agricultural Research. 20-26p.

Keyword(s): *Rangelands / Environmental degradation / Pasture ecology / China*

Call No: 636.08845 LOE

Lang: En

The main causes and countermeasures for the rangeland degradation in the pastoral region of China are discussed in this paper. To highlight the causes for the degradation of rangeland, this paper presents a quantitative analysis of the imbalance between animal population and pasture development. To redress this imbalance, recommendations are suggested to take into account the problems of overpopulation, overstocking, and environmental degradation through different measures.

016 Miller, D. J. 1994. **Chang Tang wildlife reserve Tibet: rangeland survey report.** New York: New York Zoological Society. 52p.

Keyword(s): *Vegetation / Livestock / Rangelands / Protected areas / China, Tibet*

Call No: 639.95 MIC

Lang: En

The Changtang Wildlife Reserve in northern Tibet, established in 1992, is the largest protected area in Tibet and one of the largest protected areas in the world. This report summarises the findings from rangeland and livestock investigations and provides recommendations for further conservation work in the reserve. The findings are based on range ecology, livestock production practices, pastoral management strategies, and wildlife-livestock interaction in the reserve.

017 Ni Zubin. 1985. **Grassland resources and grazing systems in Xizang (Tibet).** *Natural resources* (3):13-19

Keyword(s): *Grazing lands / Animal husbandry / Grasslands / China, Tibet*

Call No: 333.7 NAR

Lang: Ch

018 Qiu Faying; Chen Qingheng. 1986. **Exploitation of the marshlands and the marshmeadows and rational use of the grassland resources in Ruorgai region.** In Li Wenhua; Pandey, K. K. (eds.) *Watershed management: proceedings of the International Workshop on Watershed Management in the Hindu Kush-Himalayan Region* held on 14-19 Oct 1985 at Chengdu. Kathmandu: International Centre for Integrated Mountain Development / Beijing: Chinese Academy of Sciences. Commission for Integrated Survey of Natural Resources. 45-50p.

Keyword(s): *Grassland management / Vegetation / China*

Call No: 333.716 LIW

Lang: En

The grassland in Ruorgai region is distributed over a large area of plentiful water and luxuriant grass, and is an important base for the plateau animal husbandry. The marshlands and marsh meadows have also been developed well and play an important role in the region. This paper based on the vegetation surveys of Ruorgai region, presents suggestions for the exploitation of the marshlands and marsh meadows, and the utilisation of the pasture resources of the region. Characteristics of the natural environment of Ruorgai region are also illustrated in brief.

019 Sheehy, D. P. 1992. A perspective on desertification of grazingland ecosystems in north China. *Ambio: a journal of the human environment* 21(4):303-307

Keyword(s): Grassland ecology / Desertification / China

Call No: 304.2 AMB

Lang: En

Desertification of arid and semi-arid grazing land ecosystems is a serious problem in northern China. The contemporary desertification arises from the improper land use and production practices that are associated with economic, social and political agendas having precedence over ecological stability. Although degradation of grazing land leading to desertification is obvious and acknowledged, development emphasis continues to focus on sedentary agriculture. This paper examines the condition predisposing grazing land to desertification and describes the causes of desertification in the historical and contemporary context and suggests possible means to foster sustainable use of grazing land ecosystems.

020 Su Daxue. 1987. Characteristics of natural grasslands in Guizhou Province and its evaluation. *Journal of natural resources* 2(2):160-160

Keyword(s): Grasslands / Resources evaluation / China

Call No: 333.705 JON

Lang: En/Ch

Studying natural grasslands of 84 counties in Guizhou Province and analysing 1,331 quadrat samples, this paper explains that these are the grasslands with secondary characteristics, most of them are unstable, situated in the succession from grasses to bush to forest, besides, there are also relatively stable alpine meadows and bush-grasslands with plagioclimax. The grasslands in Guizhou Province are mainly scattered patchily among the woodlands and agricultural fields. Large area of these grasslands are located on the middle-mountain areas and plateaus with the elevation above 1,000m, these places are characterised with small population, long distance from settlements, and difficulty of accessibility. The grasslands often stretch continuously as a belt on the ridges and tops of the middle-mountains. The total coverage of the grasslands in Guizhou, is about 80-85 per cent. The thickness of the grass layer is about 60-70cm, and the yield of the fresh grasses is about 6,000-9,000kg/ha. The time taken for the growth of green grass is about 240-300 days annually. There are 96 per cent of grasslands that can be used for making hays. The grasslands in Guizhou abound with variant plants, mainly winter-green or evergreen grasses. The alpine meadows have relatively high value for animal

husbandry. Most of them are suitable to exploitation with advantageous conditions. The quality of the grasslands in Guizhou is poor, 76.5 per cent of them are deficient in legumes, which occupy only 0.96 per cent of the total grasses by weight, they are the grasses with low content of protein. There are about 40 per cent of these grasslands with thin soil depth less than 40cm, and there are about 50 per cent of the grasslands with slopes more than 25 per cent, about 74.8 per cent with bare rocks or stones and 25 per cent undergo soil erosion. The durability for grazing is poor. All of these, to some extent, are the limitations to their exploitation.

021 Sue Daxue. 1990. Methods of raising the production level of grasslands in the high-frigid pastoral areas. (MFS [Mountain Farming Systems] discussion paper, 11). Kathmandu: International Centre for Integrated Mountain Development. 16p.

Keyword(s): Mountain development / Pasture management / China

Call No: 333.74 SUM P

Lang: En

The paper analyses the characteristics and problems of grassland agriculture and low fodder productivity and low output of livestock products from high-frigid pastoral areas in Damxung County. The paper also provides recommendations and methods for improving productivity in these pastoral areas through technical and management changes.

022 Sun Qingguo. 1992. Management of pastoral systems in the mountains: experiences and lessons from west Sichuan, China. (MFS [Mountain Farming Systems] discussion paper, 30). Kathmandu: International Centre for Integrated Mountain Development. 29p.

Keyword(s): Pasture management / Animal husbandry / China

Call No: 634.99 SUM P

Lang: En

This paper documents experiences in West Sichuan (China). The key features of the Chinese approach, which could be profitably adopted by other high mountain pastoral areas, are: focus on diverse local animals and local grazing plant species. Unlike conventional development interventions that focus on new introductions, China, through public interventions, attempts to better manage and improve environmentally well-adapted local (animal and grazing) resources by ameliorating deficits through evolving local resource-based options. This has helped maintain the biodiversity and has enhanced the economic gains of local communities. Besides providing a glimpse of the diverse animals and

grazing resources that exist in West Sichuan, the paper establishes a need for replication of the Chinese approach elsewhere in the HKH Region. The paper also documents a way in which high mountain 'niche' can be identified and harnessed on a sustained basis without undue disruptions associated with external interventions.

023 Sun Qingguo. 1989. **The pasture types and utilisation in Jinchuan county, Sichuan, China.** Kathmandu: International Centre for Integrated Mountain Development. 21p.

Keyword(s): *Pasture management / China, W Sichuan*

Call No: 633.202 SUP P

Lang: En

Jinchuan County is situated in northern Hengduan mountains in northwestern Sichuan Province. Animal husbandry is one of the important farming components in the county. The pasture land is the basis of the pastoralism and the main source of fodder in Jinchuan. The quality and quantity of pastures directly influence the livestock products and the life of farmers. This paper evaluates the carrying capacity potentials of this pasture land by analysing pasture types, productivity, distribution, and utilisation of the pasture land. At the same time, some issues of management and utilisation are listed according to the investigation and some strategies for solving the problems are suggested.

024 Tian Xiaowen; Sun Qingguo. 1985. **Position of some knotwood plants in the fodder of natural grassland in Hengduan mountain area.** *Natural resources* (1):47-53

Keyword(s): *Grazing lands / Hills / Feed crops / Animal husbandry / xmChina*

Call No: 333.7 NAR

Lang: Ch

025 Wang Yusheng; Pan Jiezheng. 1986. **Mathematical model for multifactorial evaluation of natural grassland resources.** *Acta phytocologica et geobotanica Sinica* 9(3):165-172

Keyword(s): *Natural resources / Mathematical models / Grazing lands / Grasslands / China*

Call No: 574.5 ACP

Lang: Ch

026 Yang Dingguo. [1992]. **Degradation and protection of grassland on the Qinghai-Tibet plateau.** In Walling, D. E.; Davies, T. R. ; Hasholt, B. (eds.) *Erosion, debris flows and environment in mountain regions: proceedings*

of the International Symposium held on 5-9 Jul 1992 at Chengdu, China. (IAHS [International Association of Hydrological Sciences] publication, 209). Oxfordshire: International Association of Hydrological Sciences. 471-476p.

Keyword(s): *Soil deterioration / Soil erosion / Grassland management / China, Tibet*

Call No: 551.353 WAE

Lang: En

The Qinghai-Tibet plateau, which has been called the roof of the world and the third pole, is a vast territory which includes a large area of grassland. Grassland degradation is an important component of eco-environmental degradation in the world today, and grassland protection represents an important aspect of eco-environment protection. This paper presents the characteristics of degraded grassland, and discusses the causes and trends of grassland degradation in the region. The countermeasures which have been proposed for protecting the grassland resource and preventing grassland degradation in the Qinghai-Tibet plateau have been reviewed.

027 Zhang Da-yong; Wang Gang; Du Guo-zhen. 1988. **A quantitative study of the vegetation succession on the abandoned arable lands of the subalpine meadows in gannan prefecture of Gansu Province [China]: analysis of community composition.** *Acta phytocologica et geobotanica sinica* 12(4):283-291

Keyword(s): *Land resources / Alpine ecosystem / Vegetation / Grasslands / China*

Call No: 574.5 ACP

Lang: Ch

The study of the succession of plant communities in the abandoned arable lands in the area of subalpine meadows of Gannan prefecture, is made by inferring from comparing the representative sites of abandoned arable lands of different ages, which have been described in this paper. The analysis of community composition in succession shows: first, the importance of the grasses and sedge plants in the early stages of succession, they rapidly dropped from 71 to 6 per cent in 12 years, and as a result of the aggregation and spreading of grasses and sedge plants, they recovered gradually to 30-40 per cent in the early stages of succession and reduced in the later stages of succession, but the importance of poisonous herbs remains steady, accounting for about 10 per cent of the community; second, the species richness, Simpson's diversity and evenness of the community increases while its dominance decreases with the development of succession; third, the dominance diversity curve of the initial community

is roughly geometric, as species are added, the curve approaches to a lognormal distribution, but in the final stage, the curve approaches a MacArthur broken-stick distribution.

028 Zhou Shourong; Gan Youmin; Pu Chaolong. 1989. **Seasonal dynamics of phyto-biomass in subtropical mountainous grassland in Western Sichuan basin.** *Journal of ecology* 8(4):1-1

Keyword(s): Biomass / Grasslands / China, W Sichuan

Call No: 574.505 JOE

Lang: En/Ch

India

029 Bhat, S. A.; Kaul, V. 1989. **Grassland communities of Dachigam: Telbal catchment, Kashmir.** *The Indian forester* 115(8):567-577

Keyword(s): Grasslands / Environmental degradation / Jammu and Kashmir

Call No: 634.9 INF

Lang: En

The paper analyses the ecological status of three grasslands in Dachigam - Telbal Catchment, Kashmir. Study has revealed the presence of *Themeda anathera-chrysopogon echinulatus* association on the slopes subject to light grazing, *Poa stewartiana* - *Stipa sibirica* on the slopes subject to moderate grazing and *Cynodon dactylon* - *Bothriochloa pertusa* association on the slopes subject to heavy grazing. The result further indicates that grazing reduces the vegetal cover significantly. Mild grazing is observed to increase the plant species diversity, richness and evenness at the first instance and with heavy grazing these parameters are observed to be reduced significantly. More of protection has been observed to bring slight decrease in the values of these parameters. Similarity between the grasslands have been reported to be effected both qualitatively and quantitatively with varying degrees of protection and grazing. Possible causes of occurrence of these changes in the grasslands under study are discussed. Suggestions are made not to allow heavy grazing or complete protection of grasslands as both of these treatments lead to homogenisation and decrease in plant diversity which is a great threat to the community as a whole.

030 Ghosh, A. N. 1990. **Grassland vegetation in the Himalayan region of India: a review.** Rome: FAO. Forestry Dep. Policy and Planning Service. 98p.

Keyword(s): Grassland ecology / Himalayas / Grasslands / India

Call No: 633.2 GHG

Lang: En

Rapid deterioration of the Himalayan ecosystem due to pressure from the human and livestock population has been a matter of serious concern to all the countries of the region, i.e. Bhutan, Nepal, India, and Pakistan. Judicious utilisation of the natural resources such as soil, water, forests, grasslands, etc. is extremely important for the preservation of the ecosystem on which prosperity of the nations depends. Research has been carried out on sub-alpine, temperate, sub-tropical grasslands fairly extensively in one or two countries of the region but most of the results lie scattered in the reports of the different institutions and in papers published in various journals. This review is presented, in a consolidated form, updated information on the research done on temperate and alpine grasslands and related forage species in the Himalayan region of India and indicates those areas in which research work should be intensified. Additionally, geology, climate and floristic composition of the Himalayan region is described. Similarly, grassland characteristics, productivity of natural grasslands and their performances of the temperate and subtropical species in the Himalayan region are discussed.

031 Gupta, B.; Singh, R.; Verma, R. K. 1994. **Biomass fluctuations in grazing lands around Shimla, Himachal Pradesh.** *The Indian forester* 120(6):488-499

Keyword(s): Grazing lands / Energy resources / Biomass / India, HP, Shimla

Call No: 634.9 INF

Lang: En

The study of biomass production in a community leads to a deeper insight into the behaviour of vegetation and quantity of matter produced in a given interval under prevailing climatic conditions. In the present paper results for the study on biomass fluctuations following grazing is presented. The plant biomass is reported to vary from month to month and season to season on controlled and grazed sites. According to the report, seasonally, the above ground biomass was reported to be maximum in rainy season followed by summer and winter. Below ground biomass was reported to be maximum in winter, followed by monsoons and summer. Among different plants, grasses were reported to be the major contributors to the community biomass.

032 Jodha, N. S. 1988. **Fuel and fodder management systems in the arid region of western Rajasthan.** Kathmandu: International Centre for Integrated Mountain Development. 47p.

Keyword(s): Fuelwood / Feed crops / India

Call No: 333.9 JOF P

Lang: En

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This document highlights the features of natural resources base of the region with focus on scarcity and instability of biomass production in the arid areas; societal responses to the problem at different levels; the farmer's strategies to manage fuel and fodder situation; and recent changes accentuating the biomass scarcity. Finally, the lessons from past experience and possible approaches to handle the problem by the identification of some components for future strategies to restore balance between demand and supply of fuel and fodder for the arid region have also been discussed.

033 Kumar, A. 1995. **Germplasm survey and identification of specific fuel and fodder yielding wild shrubs of high altitude Garhwal Himalaya.** In Singh, R. B.; Haigh, M. J. (eds.) *Sustainable reconstruction of highland and headwater regions: proceedings of Third International Symposium on Headwater Control* held on 6-8 Oct 1995 in New Delhi, India. New Delhi: Oxford & IBH Pub. 581-588p.

Keyword(s): *Germplasm conservation / Garhwal Himalayas / Plant resources / Genetic resources / Deforestation / India, UP, Garhwal*

Call No: 551.48 SIS

Lang: En

Report on extensive survey of high altitude Garhwal Himalayas carried out to identify wild shrubs growing in the area and to record its occurrence, abundance, growth and reproductive details along with its information regarding possibilities of its utilisation as fuel and fodder by the rural people is presented in this paper. Identified species are categorised according to its distribution and utility. Emphasis is given on fast growing woody shrubs forming compact vegetal cover on degraded wastelands, growing in adverse climatic/edaphic conditions and having deep penetrating root systems. Based on the survey and plantation analysis various recommendations have been suggested.

034 Melkania, N. P.; Tandon, J. P. 1988. **Investigation on the natural grasslands and their degradation and regeneration in Kumaon Himalaya.** In Chadha, S. K. (ed.) *Himalayas: ecology and environment*. New Delhi: Mittal Publications. 137-167p.

Keyword(s): *Grassland management / Kumaun Himalayas / India, UP*

Call No: 551.432 CHH

Lang: En

Information on the ecological features and predominance of grasslands along with the gradient of soil and environmental factors is an essential

prerequisite for launching any improvement programme. This paper attempts to generate more extensive information on various aspects of grassland in Kumaon Himalayas selected to represent sites for most of the agro-climatic conditions in relation to the history of their management with a view to develop an appropriate grassland improvement management programme. The paper also emphasises the implications of this information in retrospective and the formation of strategy for future improvement programmes.

035 Nigam, A. K.; Tyagi, D. K.; Gujar, S. M. 1994. **An approach to the management of grasslands in great Indian Bustard areas.** *The Indian forester* 120(10):908-914

Keyword(s): *Grassland management / Nature conservation / Birds / Species / India*

Call No: 634.9 INF

Lang: En

This paper presents the management of grassland areas that host the Great Indian Bustard and other endemic species of bird (*Ardeotis nigriceps*) on the Indian sub-continent. This paper focusses on grassland management objectives, existing grassland management practices and improvement of existing grasslands. Additionally, general information on the Great Indian Bustard area and type of grassland and vegetation of the Great Indian Bustard area are given in brief.

036 Poffenberger, M.; Sarin, M. 1995. **Fiber grass from forest land: a case from North India.** In Fox, J. *Society and non-timber forest products in Tropical Asia*. (East West Center occasional paper: environment, 19). Honolulu, HI: East-West Center. 109-129p.

Keyword(s): *Fibre crops / Grassland management / Pulp and paper industry / Forest management / India*

Call No: 634.9 FOS

Lang: En

Fibre grasses are important raw materials for India's rural rope-making industries and commercial paper mills. Bhabbar, or sabai grass (*Eulaliopsis binata*), grows abundantly on forest lands in eastern India and in the Shivalik Range, an area stretching from Uttar Pradesh state to the Pakistan border at the base of the Himalayas. This paper explores how grasslands are managed by the Haryana Forest Department (HFD) and how lease-harvesting rights are allocated to contractors and to paper mills. Reactions of the paper mill, of private contractors and that of the Haryana Forest Department (HFD) are also discussed. The paper also chronicles the experiences of the Hill Resource Management Societies (HRMS) in protecting and using grass lease

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lands under a Forest Department programme to transfer management and exploitation rights to an important non-timber forest product from larger industries and wealthy middlemen to forest communities in order to improve forest management.

037 Rao, A.; Casimir, M. J. 1990. **Perspectives on pastoral economy and ecology in the Western Himalaya.** In Sah, N. K.; Bhatt, S. D.; Pandey, R. K. Himalaya: environment, resources and development. Almora: Shrèe Almora Book Depot. 386-402p.

Keyword(s): Parasitic diseases / Grassland management / Himalayas

Call No: 551.431 SAH

Lang: En

In this paper, the authors propose to briefly discuss a few of the preliminary results of their multidisciplinary field research in a part of the western Himalayas regarding the perspectives on pastoral economy and ecology in the western Himalayas.

038 Reynolds, V.; Nautiyal, B. P. 1990. **The ecology of grazing and fodder collection in Garhwal north India.** In Sah, N. K.; Bhatt, S. D.; Pandey, R. K. Himalaya: environment, resources and development. Almora: Shree Almora Book Depot. 3-9p.

Keyword(s): Grassland ecology / Fodder plants / India

Call No: 551.431 SAH

Lang: En

In Garhwal, all villages contain a number of cattle, oxen, buffaloes, goats, sheep or mules according to the station of the village in relation to nearby forest. Grazing and fodder collection are related to each other, both being concerned with the maintenance of livestock. This paper presents the problems in human ecology through grazing and fodder collection. The present situation of livestock, grazing and fodder collection in Garhwal is also presented in brief.

039 Sant, H. R. 1988. **Effects of grazing on seed production of grassland species from the upper Gangetic plains of India.** In Agarwal, S. K.; Garg, R. K. (eds.) Environmental issues and researches in India. Udaipur: Himanshu Publications. 129-135p.

Keyword(s): Grazing lands / Grasslands / Seed production / India

Call No: 304.2 AGE

Lang: En

Grasslands are economically valuable for man. The population in some species increases with greater degree of grazing intensity due to the fact that the

competition from those species which are palatable is reduced. This paper discusses the effect of grazing on seed production of grassland species from the upper Gangetic plains near Varanasi, India. Seed output in overgrazed field was found to increase in species like *Panicum psilopodium*, *Eragrostis viscosa*, *Dactyloctenium aegyptica*, *Paspalidium flavidum* and *Eragrostis tenella*. The seed productivity of these grassland species was calculated in terms of seed output and the results are discussed with the help of different charts.

040 Santvan, V. K.; Agrawal, H. O. 1993. **Floristic composition of grassland above treeline in north-west Himalaya.** In Dhar, U. (ed.) Himalayan biodiversity: conservation strategies. (Himavikas publication, 3). Nainital: Gyanodaya Prakashan. 245-250p.

Keyword(s): Grasslands / Pasture ecology / India

Call No: 574.5 DHH

Lang: En

The present paper deals with floristic composition above treeline in northwestern Himalayas at Rahla. A total of 79 species, comprising 11 grasses, 7 sedges, 4 leguminous forbs and 57 non-leguminous forbs are reported. *Agrostis*, *Anemone*, *Danthonia*, *Plantago*, *Poa*, *Polygonum*, *Potentilla* and *Fragaria* are included as common genera. The life form spectrum of the flora in the present paper revealed 32.05 per cent geophytes, 29.48 per cent hemigeophytes, 26.29 per cent chamaephytes and 11.53 per cent therophytes. Finally, the paper is concluded by stressing that higher percentage of geophytes and hemigeophytes reveals the effect of environmental severity of alpine region.

041 Shah, S. L. 1991. **Management of grasslands and wastelands for sustainable fodder production in Almora district: some learning lessons of Khulgad Micro-Watershed Project.** In Society for Himalayan Environmental Rehabilitation & Peoples' Action. Livestock development in the Himalayan regions of India. Lucknow: Society for Himalayan Environmental Rehabilitation & Peoples' Action. v.2(155-166)p.

Keyword(s): Grassland management / Waste land / Feed grasses / India, UP, Almora

Call No: 636 SHL

Lang: En

Animal husbandry is an important enterprise in hill districts of Uttar Pradesh. It is well accepted that livestock enterprise cannot thrive without sustainable and adequate fodder supply, which is difficult due to small size of farms and lack of irrigation facilities.

Fodder is, by and large, not cultivated and is collected from forests, grasslands besides agricultural residues. As the livestock population is increasing, the availability of fodder, grasses and leaves is dwindling due to poor management and ecological degradation of the land. In this article an attempt has been made to highlight the fodder production problems at the district level. Some lessons from the Khulgad Micro-Watershed in Almora district are also presented.

042 Sharma, P. D. 1991. **Alpine pastures.** In Sharma, P. D.; Singh, K. Status report on Kinnaur and Spiti catchments of Sutluj river in Himachal Pradesh. Palampur: Himachal Pradesh Krishi Vishwa Vidyalaya. 89-97p.

Keyword(s): Pastures / Alpine ecosystem / India, HP, Kinnaur / India, HP, Lahaul-Spiti

Call No: 551.483 SHS

Lang: En

The alpine pastures constitute the largest area of about 45 per cent of total geographical area in Kinnaur and 18 per cent of total area in Spiti. This paper describes three categories of pastures depending upon climatic conditions found in Kinnaur and Spiti. The nutritional status of these pastures and soil characteristics (morphological and physical) governing their availability is discussed and provides proper recommendation for fertilisation. Special attention is given to various physical characteristics governing the water retention and infiltration behaviour of the soils to discern their role in the hydrological functioning of the mountain ecosystem. Different measures taken for the sustained productivity of the pasture lands is given.

043 Yadav, B. P. S.; Prasad, R. N. 1991. **Grassland resources of eastern Himalayan region.** In Society for Himalayan Environmental Rehabilitation & Peoples' Action. Livestock development in the Himalayan regions of India. Lucknow: Society for Himalayan Environmental Rehabilitation & Peoples' Action. v.2(172-186)p.

Keyword(s): Grassland management / Himalayas

Call No: 636 SHL

Lang: En

The eastern Himalayan region represents an area ranging from tropical plains to temperate and alpine hills. The grassland, forage and feed resources of these hilly areas have a high potential for the intensification of dairy, meat, fur, and wool production, and for the survival of wildlife. In the present communication, an attempt has been made to take into account the grassland and livestock resources for increasing the productivity and some reflection on future prospects of further improvement.

Nepal

044 Agricultural Projects Services Centre / 1979. **Range and pasture production.** In Agricultural Projects Services Centre / South-East Consortium for International Development. Resource Conservation and Utilization Project. Kathmandu: Agricultural Projects Services Centre / Chapel Hill, NC: South-East Consortium for International Development. v3, annex 1c, 136p. Kathmandu: Agricultural Projects Services Centre / Chapel Hill, NC:

Keyword(s): Pastures / Feed crops / Pasture management / Grazing lands / Livestock / Nepal

Call No: 333.7 REC 4

Range and pasture production in the project area is discussed in this paper. Ecological groupings of rangeland and resource present for feeding is described. Recommendation and programme to increase fodder production in resource conservation and utilisation project area is discussed in terms of range management, feed production and development, pasture development programme and its utilisation.

045 Archer, A. C. [1988]. **Nepal: high altitude pastures and their development in the remote border districts - feasibility study and project formulation.** Kathmandu: FAO. 215p.

Keyword(s): Pasture management / Feasibility studies / Pastures / Project design / Nepal

Call No: 333.74 ARN

Lang: En

This report on the high altitude pastures and their development in the remote border districts tends to form an appraisal of the remote region in terms of natural basic resources particularly in relation to the existing nature of the alpine pasture and the complex pasture systems that have been created through the destructions of the natural forest. The impact upon a new forage and fodder development programme in the high altitudinal zones in terms of interrelated projects in research and extension dissemination of information, training programmes and seminars have been discussed.

046 Archer, A. C. 1990. **Pasture and Fodder Development in the High Altitude Zone Project: Nepal - project findings and recommendations.** Kathmandu: FAO / Kathmandu: UNDP. 185p.

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Keyword(s): *Feed crops / Highland / Pasture management / Nepal*

Call No: 333.74 ARP

Lang: En

The document presents the findings and recommendation of a project carried out for pasture and fodder development in the high altitudinal area. The document concentrates mainly upon three main activities; (a) pasture/rangeland improvement as a means to increase productivity through plant introduction, seed production, livestock control, deferred grazing, incorporation of winter feed into cropping systems, and the investigation of indigenous forage grasses and legumes; (b) reconnaissance survey of pasture/rangeland with an inventory of grazing, natural resources and livestock in the four emergency districts of Humla, Mustang, Sindhupalchok and Dolakha; and (c) in-service training programme conducted by the project. Socioeconomic system of rural communities has also been highlighted regarding the four emergency districts. Finally, recommendation regarding the development of forage and fodder for improving livestock at village level is also given.

047 Basnyat, N. B. 1989. **Pasture and Fodder Development in the High Altitude Zone: report on pasture and rangeland resources in upper Mustang - consultant's report.** Kathmandu: UNDP. 50p.

Keyword(s): *Feed crops / Pasture management / Highland / Nepal, MWDR, Mustang*

Call No: 333.74 BAP

Lang: En

This report is based on a survey of pasture and rangeland resources of upper Mustang. The report evaluates the pasture development work carried out in Mustang district by the regional pasture section and advises some improvements. It also reports on the current situations regarding pasture conditions and livestock feed resources. Livestock movements along the northern border and their potential effects on the pasture and food situation is also reported. Finally, feasibility in Mustang district of using irrigation for crop and fodder production has been investigated. Suggestions are made for the policy that should be implemented by HMG on four main aspects such as: i) improved communication, ii) provide an alternative source of energy, iii) diversify the economy, and iv) promote the agricultural sector. These aspects are fully discussed in the text with specific recommendations for future action.

048 Bauer, J. J. 1989. **Grassland ecology of the Himalayan region: survey manual.** (Nep 85/011 field document, 14). New York, NY: UNDP / Rome: FAO. 8p.

Keyword(s): *Grassland ecology / Himalayas / Nepal*

Call No: 333.74 BAG F

Lang: En

Highland pastures in protected areas are mostly utilised by livestock, either on a seasonal basis or all year round. Heavily utilised areas especially around settlements show severe degradation, which decreases both the carrying capacity for livestock as well as the diversity of species. To conserve grasslands and grassland species as well as to improve living conditions for people within protected areas, a finely tuned balance has to be found between their different needs. This will be attempted with an integrated survey system. This document presents the survey procedure to study grassland ecology of the Himalayan region.

049 Carter, M. G. 1979. **Range management and animal husbandry components.** In Agricultural Projects Services Centre / South-East Consortium for International Development. Resource Conservation and Utilization Project. Kathmandu: Agricultural Projects Services Centre / Chapel Hill, NC: South-East Consortium for International Development. v3, annex 1b, 44p.

Keyword(s): *Rangelands / Livestock management / Feed crops / Pasture management*

Call No: 333.7 REC 4

Range management and pasture development and animal husbandry are indispensable elements of resource conservation and utilisation project. This paper focuses on the range management and animal husbandry components. Physical characteristics of the area are described, as it relates to range management. Project setting and methodology is presented based on the livestock and resource conditions. Project components, area which requires research are discussed and recommendation required for the action plan of the project are also given.

050 Fox, J. 1995. **Non-timber forest products in a Nepali village in 1980 and 1990.** In Fox, J. Society and non-timber forest products in Tropical Asia. (East West Center occasional paper: environment, 19). Honolulu, HI: East-West Center. 37-51p.

Keyword(s): *Forest products / Social conditions / Fodder plants / Livestock management / Nepal, WDR, Gorkha*

Nepal, WDR, Gorkha

Call No: 634.9 FOS

Lang: En

Non-timber forest products (NTFPs) generally includes food, medicine, resins, latex, fodder and fibre grasses, wildlife, fuelwood, rattan and other items. In the sal (*Shorea robusta*) forests of northern India and Nepal, however, fodder and fuelwood make up the largest portion of the non-timber forest products. This paper documents differences in forest conditions and changes in the production and collection of non-timber forest products, and seeks to determine what factors have triggered these changes. The paper is based on the study made for non-timber forest products in a village in Nepal in 1980 and 1990. Results for the study made in 1980 for the forest-use practices of a village in the hills of central Nepal indicate that the forests of the village were in poor condition and that the major causes of the degradation were the grazing and fodder collection required for the large livestock population then. But, resurvey for the forest condition and forest-use practices in 1990 gave much better results than in 1980, which have been illustrated in this paper. Bhogteni, a village on the northern side of Gorkha has been taken for the study.

051 Harrison, A. 1989. Results of a trial to investigate the effect of compost in the potting mixture of Dudhilo. (LAC technical paper, 12). Pokhara: Lumle Agricultural Centre. 7p.

Keyword(s): Composts / Fodder plants

Call No: 630.721875 LUA 44

Lang: En

Obtaining sufficient forest top soil, which is the recommended medium for nursery work in Nepal, is a problem in many nurseries. One way of improving poor quality soil is to add well-potted compost. This will improve the physical structure of the soil as well as its nutrient status and can also bulk-up meagre supplies of potting mixture. In extreme cases, compost and sand could be used to create a suitable soil. This document presents the result of a trial to investigate the effect of compost in the potting mixture of Dudhilo.

052 Heuch, J. 1986. The work of Lumle's Forestry/Pasture Section. In Robinson, P. J. Proceedings of the First Meeting of the Working Group on Fodder Trees, Forest Fodder and Leaf Litter held on 23 Jun 1986 at Kathmandu, Nepal. (FRIC Occasional paper, 3/87). Kathmandu: Nepal. Ministry of Forest. Forest Research and Information Centre. 10p.

Keyword(s): Feed crops / Forestry / Institutional framework / Pastures / Nepal, WDR, Kaski

Call No: 636.08551 ROP P

Lang: En

This short note covers a brief information on the work done by Forestry/Pasture section of Lumle for the improvement of fodder quality.

053 Miller, D. J. 1984. Range/pasture and livestock resources in selected panchayats of Myagdi and Mustang districts, Nepal. Kathmandu: Resource Conservation and Utilization Project. 50p.

Keyword(s): Rangelands / Pastures / Livestock management / Nepal, WDR, Mustang / Nepal, WDR, Myagdi

Call No: 636.085 MIR

Lang: En

Reports based on the range/pasture and livestock resources in selected Panchayats of Myagdi and Mustang districts of Nepal are compiled in this volume. It consists of four parts, first part presents the report on the range/pasture and livestock resources found in Myagdi district including data of six Panchayats belonging to that district. Observations and recommendations regarding the existing department of livestock development and animal health through pasture development programme in Myagdi District are presented in the second part. The report for range/pasture and livestock resource and management and recommendations for Lete and Kenja Panchayats in lower Mustang district is included in the third part. A report of the observations and recommendations regarding the existing development of livestock development and animal health obtained through range/pasture development project in Mustang district are presented in the fourth part.

054 Miller, D. J. 1993. Rangelands in northern Nepal: balancing livestock development and environmental conservation. Kathmandu: United States Agency for International Development. 104p.

Keyword(s): Livestock / Rangelands / Grasslands / Pasture management / Nepal

Call No: 333.74 MIR

Lang: En

The high elevation rangelands of Nepal have supported livestock and herders for thousands of years while sustaining a unique flora and fauna. Despite their extent and importance, the ecology of the grazing lands of Nepal is still poorly understood. Within the high-elevation rangeland region of northern Nepal there are vast differences in range resources, biodiversity, indigenous people, and livestock production systems and a range of causalities that operate in the ecosystem. These extreme variations make assessments of the

rangelands and pastoral production systems difficult, and complicate the development planning process and the formulation of sustainable, improved livestock production management strategies and conservation programmes. This report focusses primarily on major issues and options for the range livestock sector and environmental conservation in the rangelands of northern Nepal.

055 Numata, M. 1985. **Ecological basis of pasture management in the Himalayas: case studies from Eastern Nepal.** In Singh, T. V.; Kaur, J. (eds.) Integrated mountain development. New Delhi: Himalayan Books. 217-238p.

Keyword(s): *Pasture management / Ecology / Himalayas / Nepal*

Call No: 574.5264 SIM

Lang: En

In the humid Himalayas, particularly in eastern Nepal, there are many semi-natural pastures and meadows widely distributed from lowlands to the highlands. This paper presents the process of deterioration of primeval nature in a developing country like Nepal from the viewpoint of applied ecology and its management. A case study from eastern Nepal is presented, laying stress on the vegetational analysis of semi-natural grasslands of that area. Environmental factors of pastures and the vertical distribution of grasses and grasslands are briefly described. Additionally, the structure, dynamics and management of grassland vegetation have also been elucidated. Some examples of the floristic composition of grassland vegetation and the altitudinal distribution of grasses as well as tree species are given in tabulated form.

056 Numata, M. 1990. **Semi-natural pastures and their management in eastern Nepal.** In Numata, M. Ecology and conservation: the selected papers. Tokyo: Meiseikai. 138-148p.

Keyword(s): *Pasture management / Pastures / Nepal, EDR*

Call No: 574.5 NUE

Lang: En

Ecology of semi-natural pastures in the humid Himalayan region of eastern Nepal has been studied by the Chiba University team. From the subtropical mixed forest in the lowland to the cold temperate evergreen needle-leaved forests, all altitudinal zones are potentially forest zones. The subalpine zone is reported to be occupied by scrubs of juniper and rhododendron. These woody vegetation zones are widely reported to change to semi-natural pastures for domestic animals. The altitudinal grassland zones are classified into two types; upper, cool type and lower, warm type. In the lowland, it is reported that

the people stress rice cultivation, while in the highlands, stress is on animal husbandry. The grass cover after slash and burn agriculture in the inhabited area and on burnt fields of forests and alpine scrubs are used for grazing. The semi-natural pastures and their management in the eastern Nepal has been examined and presented in this paper. The author has proposed the measurement of the degree of succession and the index of grassland condition as the best method to judge the conditions and trends of pastures.

057 Numata, M. 1990. **The sustainable use of semi-natural pastures in the humid Himalayas.** In Numata, M. Ecology and conservation: the selected papers. Tokyo: Meiseikai. 149-156p.

Keyword(s): *Pasture management / Himalayas*

Call No: 574.5 NUE

Lang: En

In humid Himalayan areas, particularly in eastern Nepal, the mountainous land higher than upper limit of rice cultivation is mainly used for the grazing of yak and dzo. Paddy is cultivated in low altitudes, and animal husbandry and upland field agriculture in high altitudes. The importance of animal husbandry in agriculture in a broad sense increases, particularly in high altitudes. There are many semi-natural pastures and meadows widely distributed from the lowlands to the highlands. The sustainable use of semi-natural pastures in the humid Himalayas is discussed in this paper in two parts. The context of diagnosis of the condition and trend of pastures is described in the first part, while the second part discusses the diagnosis of the condition of pastures in eastern Nepal.

058 Paudyal, D.; Bauer, J. J. 1988. **A survey of wildlife, grasslands and pastoral systems of the upper Hinku and Hongu valleys, Nepal.** (Nep 85/011 field document, 12). New York, NY: UNDP / Rome: FAO. 118p.

Keyword(s): *Grasslands / Pastures / Wildlife conservation / National parks / Nepal*

Call No: 333.78 PAS

Lang: En

This is a survey report of wildlife, grasslands and pastoral systems of the upper Hinku and Hongu valleys of Nepal. The report first describes the pastoral systems, habitats, livestock, and wild ungulates, grassland, diversity of grasslands, and grassland productivity of the Hinku-Hongu region. Then, the record of livestock density, factors influencing the condition of grasslands, wildlife and species richness and forest condition of the Hinku-Hongu region, is described. Brief information on major crop production, trade and crafts, hunting, tree fodder, fuel consumption and demand, medicinal plant gathering, tourism, religious sites and

059 Rajbhandari, K. R. 1991. **Grassland ecology and preliminary studies of bamboos in the Apsuwa valley.** (Makalu-Barun Conservation Project working paper, 13). Kathmandu: Makalu-Barun Conservation Project / Franklin, WV: Woodlands Mountain Inst. Mount Everest Ecosystem Conservation Program. 24p.

Keyword(s): *Grassland ecology / Bamboos / Development projects / Nepal*

Call No: 574.5 RAG 50

Lang: En

Grasslands are found in all the ecological zones in the Apsuwa Valley of eastern Nepal but there is little research on the grassland vegetation of this area. This report of the grasslands and bamboos of the Apsuwa Valley is based on a field survey carried out in 1989. It assesses the types, diversity and dynamism of grassland vegetation, and identifies effect of human activities upon it. It also reports bamboo types, their use, and ecology. The report shows that signs of overgrazing or erosion in the grasslands are not prominent, and that there are very few or no legume species in the grasslands. Great scope for increasing bamboo production by opening the present inaccessible areas and by planting bamboo in suitable village or forest areas have been recommended.

060 Watanabe, T. 1994. **Soil erosion on yak-grazing steps in the Langtang Himal, Nepal.** Mountain research and development 14(2):171-179

Keyword(s): *Soil erosion / Human activity / Grazing lands / Himalayas / Nepal*

Call No: 551.432 MOD

Lang: En

Large number of livestock such as yaks, cattle, sheep, and goats are grazed in the mountain areas of the Himalayas. Transhumance, a traditional form of mountain pasturing, often results in the development of so called 'terraces' or stepped slopes, and those slopes lead to shallow soil erosion. As an initial step, this paper focusses on the problem of soil erosion caused by yak grazing in the Langtang Valley of Nepal Himalayas. First the origin of the stepped slopes is examined using a model of Howard and Higgins (1987), and then the rates of soil erosion and denudation on the stepped slopes are estimated. Finally, the contribution of the soil erosion to sedimentation in the lower plains have been discussed.

Pakistan

061 Abdul Wahid Jasra; Arshad Ali; Munnawar Ahmed Sial. 1993. **Restoring rangelands for**

improving livestock production in Pakistan. Asian livestock 18(6):65-67

Keyword(s): *Pasture management / Livestock / Animal production / Pakistan*

Call No: 636 ASL

Lang: En

This article describes the major rangeland types found in Pakistan and discusses the current status of these rangeland resources. The main causes for deterioration of these resources are also discussed. Suggestions required for future interventions are briefly illustrated, and management, resource policy, extension and education, and rehabilitation by plantation are emphasised.

062 Ch. M. Anwar Khan. 1971. **Range management in Hazara district: North West Frontier Province.** (Publication, 64). Peshawar: NWFP University of Peshawar. Board of Economic Enquiry. 116p.

Keyword(s): *Grassland management / Rangeland soils / Pakistan*

Call No: 574.52643 CHR

Lang: En

Rangelands constitute important watersheds providing natural habitats to wildlife in Pakistan, and also play a vital role in the provincial as well as the national economy. This report presents a detailed analysis of socioeconomic patterns, range use and other land use patterns, classification of land resources on 'ecosystem-approach', current state of productivity of major range types, various technical aspects of each eco-zone and suggests concrete measures and strategies for future development of rangelands in the Hazara District of Pakistan.

063 M. Shabbir Baig. 1981. **Vegetation classification for evaluation of rangelands in arid zones.** Lahore: Pakistan. Ministry of Food and Agriculture. Soil Survey of Pakistan. 57p.

Keyword(s): *Vegetation / Rangelands*

Call No: 333.335 MSV

Lang: En

The present paper deals with vegetation which is an integral part of the range ecosystem. It therefore, provides information on forage production and grazing capacities of the rangelands so essential for their evaluation and sound management planning. A number of plant communities including four associations of two alliances at the higher level and seven sub-associations, four variants and two sub-variants at the lower level, have been identified. Comprehensive and conclusive associations-wise tables showing description of plant community, species composition, their palatability and their ecological status, range problems and solutions as well as relevant landscape profiles, are given. A

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phytosociological table, presenting thirteen phytosociological groups of four plant associations as well as depicting their environmental set up is also included. A vegetation landuse map, giving the distribution and extent of plant communities too, is appended. Forage production, both actual and potential, as well as grazing capacities calculated from the clipping data from grazed and fenced areas as also palatability of plants in different landscape units provide the basic data for rangeland evaluation.

064 M. Shabbir Baig. 1981. **Vegetation classification for evaluation of rangelands in arid zones.** (Pakistan soils bulletin, 13). Lahore: Pakistan. Ministry Food and Agriculture. Soil Survey of Pakistan. 54p.

Keyword(s): *Rangelands / Vegetation / Pakistan*

Call No: 574.52643 MSV

Lang: En

In the ecological and phytosociological survey of Quetta-Pishin, number of plant communities including four associations of two alliances at the higher level and seven sub-associations, four variants and two sub-variants at the lower level, have been identified and presented in this paper. Comprehensive and conclusive associations-wise tables showing description of plant community, species composition, their palatability and their ecological status, range problems and solutions as well as relevant landscape profiles are given. A phytosociological table, presenting 13 phytosociological groups of four plant associations as well as depicting their environmental set up, is also included. A vegetation landuse map, giving the distribution and extent of plant communities too, is appended. Forage production, both actual and potential, as well as grazing capacities calculated from the clipping data from grazed and fenced areas as also palatability of plants in different landscape units provides the basic data for rangeland evaluation.

065 Noor Mohammad. 1984. **Management of Dera Ghazi Khan rangelands: prefeasibility report.** Islamabad: Pakistan Agricultural Research Council. 38p.

Keyword(s): *Pasture management / Rangelands / Pakistan, NWFP, D. G. Khan*

Call No: 574.52643 NOM P

Lang: En

This document presents the pre-feasibility report for the study made for management of Dera Ghazi Khan Rangelands. The report is divided into four broad chapters. The first chapter deals with bio-geo environment of the study area. The second chapter focusses on the management of rangeland and the third chapter discusses the rangeland improvement operations. The livestock production and marketing is

discussed in the last chapter, followed by brief conclusions.

066 Noor Mohammad. 1989. **Rangeland management in Pakistan.** Kathmandu: International Centre for Integrated Mountain Development. 193p.

Keyword(s): *Rangelands / Pasture management / Pakistan*

Call No: 333.74 NOR

Lang: En

This book highlights major constraints and problems encountered in the management of rangelands in Pakistan and provides a comprehensive review of the range research and development activities carried out in Pakistan. Covering over 60 per cent area of the country, the range resources are discussed according to their ecological potential. Range improvement practises such as forage germplasm evaluation, reseeding, sand dune stabilisation, soil and water conservation, range fertilization and burning are discussed. Important range grasses, legumes and fodder trees are recommended for large-scale planting. A range resource evaluation and utilisation model is described as a case study. The study of range livestock production systems is emphasised. Finally, future strategy for the management of rangelands in Pakistan is presented.

067 Noor Mohammad; Nasir M. Butt. 1994. **Range management: a solution to desertification.** *Progressive farming* 14(1):3-10

Keyword(s): *Desertification / Rangelands / Grassland management*

Call No: 631.05 PRF

Lang: En

The arid rangelands of Pakistan are degrading at an alarming rate due to their misuse for the past several centuries. Over-grazing has resulted in disappearance of vegetative cover from large area leaving bare soil prone to wind and water erosion, a key element to desertification. Measures for combating desertification includes management of rangelands, practising grazing management principles, and range improvement practices including water harvesting techniques, which discussed in this paper.

068. Pakistan Forest Institute. 1966. **First West Pakistan Range Management Conference: proceedings of the conference held on 5-7 Oct 1966 at Peshawar.** Peshawar: Pakistan Forest Institute. 166p.

Keyword(s): *Feed crops / Grassland management / Pasture management / Rangelands / Pakistan*

Rangelands - Ecology, Management and Development

Call No: 634.9 WEP

Lang: En

Range management is the scientific management of rangelands for continuous maximum production of forage and livestock, consistent with the use of land for other purposes. Specifically, it is the management of natural vegetation for the production of livestock. The present generation is faced with the problem of struggle against hunger and want and must harness all the natural resources hitherto neglected. The proceedings of the first conference on 'West Pakistan Range Management', includes 24 papers discussed during the conference, along with discussions made in the economic development of West Pakistan through livestock production.

Other Areas

069 ESCAP. 1994. **Range management manual for Asia and the Pacific.** Bangkok: ESCAP. 98p.

Keyword(s): *Rangelands / Manuals / Grazing lands*

Call No: 333.74 ECR

Lang: En

The Asian and the Pacific region exhibit a highly diversified ecological as well as socioeconomic setup. It is primarily a farming region which is home to 70 per cent of the global agricultural population on just 30 per cent of the total arable land. This together with a rapidly growing population, has necessitated the onerous task of keeping food production ahead of the population growth, considered a major challenge in the Asian and the Pacific region where only a fourth of its soils are suitable for crop cultivation without serious limitations. This manual focuses on environmentally sound and sustainable development of rangelands and pastures which covers over 50 per cent of the land area of the region. They offer great potential for increasing food production from livestock resources. The manual has been divided into three major parts. The first part reviews the extent and type of range resources, their management techniques, productivity, and community participation in their sustainable development. The second part covers a cross-section of model case studies undertaken in the region which provide useful insight into increasing productivity while maintaining the sustainability of the ecosystems. In its third part, the manual discusses the range assessment and monitoring methodologies in rangeland ecosystems of the Asian and the Pacific region so that appropriate and timely action can be undertaken before an ecosystem reaches an irreversible stage.

070 Kennedy, P. 1989. **Monitoring the vegetation of Tunisian grazing lands using the**

normalized difference vegetation index. Ambio (a journal of the human environment) 18(2):119-123

Keyword(s): *Vegetation / Grazing lands*

Call No: 304.2 AMB

Lang: En

This paper investigates the utility of advanced very high resolution radiometer and normalised difference vegetation index data for regional and local scale vegetation monitoring in Tunisia, a geographical area new to this type of research. A quantitative comparative analysis has also been undertaken to establish the relationship between ecological variables recorded at 22 study sites in the field and satellite derived the normalised difference vegetation index. The relationship between normalised difference vegetation index and monthly rainfall is also analysed for four selected study sites.

071 McIvor, J. G.; Chen, C. P. 1985. **Tropical grasses: their domestication and role in animal feeding systems.** In Blair, G. J.; Ivory, D. A.; Evans, T. R. (eds.) Forages in Southeast Asia and South Pacific Agriculture: proceedings of an International Workshop held on 19-23 Aug 1985 at Cisarua, Indonesia. Canberra: Australian Centre for international Agricultural Research. 55-60p.

Keyword(s): *Tropical zones / Grasses / Animal feeding*

Call No: 633.2 BLF

Lang: En

Grasses are the most important feed source for domestic herbivores. Grasses occur in almost all environments and are particularly prominent in the semi-arid tropical areas forming possibly the dominant component of natural vegetation. In this paper, the role of grasses (both native and introduced) in animal feeding systems in southeast Asia and the southern Pacific have been examined, and how the effectiveness of this role can be increased. Although grass seeds may be important in some animal diets, grasses as herbage plants either grazed *in situ*, or harvested by a cut and carry system has been concentrated. Emphasis has been placed on experiences obtained in Australia but relevant studies elsewhere in southeast Asia and the southern Pacific region are included.

Africa

072 Skoupy, J. 1988. **Developing rangeland resources in African drylands.** Desertification control bulletin (17):30-36

Keyword(s): *Vegetation / Rangelands / Dry farming / Africa*

Call No: 574.9 DEC

Lang: En

This paper briefs out different ways and means of developing rangeland resources in Africa drylands, keeping in view the production of rangelands, live population and the carrying capacity. For the development of rangeland resources, in the controlled extension of water points, pastoral grazing strategies, and planting of trees and shrubs have been emphasised. And for the best results, reseeding of range, education, training and research has been emphasised. Additionally, natural condition and the current situation of desertification is also highlighted.

Asia

073 Spring, A. 1990. **Rangeland management in Australia.** ESCAP environment news 8(2):10-12

Keyword(s): *Pasture management / Rangelands / Australia*

Call No: 304.2 ESE

Lang: En

This article presents the report on 'Rangeland Management in Australia' presented at the regional seminar-cum-study tour. It presents the overall activities of the seminar and brief information on the rangelands in Australia and some of the main recommendations made by the participants at the end of the study tour.

North America

074 Heady, H. F.; Bartolome, J. 1977. **The vale rangeland rehabilitation program: the desert repaired in South Eastern Oregon.** Portland,

OR: U. S. Dep. of Agriculture. Pacific Northwest Forest and Range Experiment Station. Forest Service. 139p.

Keyword(s): *Vegetation / Grassland management / Rehabilitation / United States*

Call No: 333.7416 HEV

Lang: En

This report evaluates, discusses the initiation, execution, and outcome of an 11-year large-scale rangeland rehabilitation programme on public domain lands in southeastern Oregon, administered by the Vale, Oregon, District of the Bureau of Land Management (BLM). The report also presents the history of land use in the district, some practical politics of land management, multiple use relationships, impacts of range rehabilitation on many parts of the rangeland ecosystem, community reactions to the programme, and economics of rangeland rehabilitation. Sage brush in combination with two grasses, the native perennial blue bunch wheatgrass and the annual cheatgrass, and is reported to dominate the vegetation on 90 per cent of the area of the district. The destruction of the vegetation, the pattern of destruction, and present range condition are inferred. Several terms are defined briefly to clarify their use in this document. Rangeland refers to the land and its resources of soil, vegetation, and wild animals. Rangeland management means land management for all purposes. Livestock management principally concerns the movement and husbandry of domestic animals. Wildlife includes game, fish and other wild animals. Animal unit month (AUM) refers to a mature cow, with or without a calf, grazing for 1 month, or its equivalent in other kinds and classes of livestock.

Forages and Pasture Development

General

075 Bettencourt, E.; Hazekamp, T.; Perry, M. C. 1992. **Directory of germplasm collections 7: forages (legumes, grasses, browse plants and others)**. Rome: International Board for Plant Genetic Resources. 356p.

Keyword(s): Directories / Fodder plants / Grasses / Legumes / Information sources

Call No: R 633.2025 BED

Lang: En

This directory of forages' germplasm collections have documented a total of 386,530 germplasm accessions and covers 397 plant genera and 3,715 species. The collections documented are being maintained by 189 institutions in 73 countries. For convenience, the collections are represented in four separate sections: legumes, grasses, browseplants (trees and shrubs) and miscellaneous. The plant genera documented per section and the availability and number of accessions documented per crop are given in tabulated form. There are also references to addresses, curator names, and duplication sites. This directory will prove useful and stimulate the conservation and use of the genetic resources of forages.

076 Bhaduri, P. N. 1989. **An overview of legume - Rhizobium symbiosis and the problem of increasing grain and fodder productivity**. In Sen, S. P.; Palit, P. (eds.) *Biofertilizers: potentialities and problems*. Calcutta: Plant Physiology Forum / Calcutta: Naya Prokash. 25-34p.

Keyword(s): Crop protection / Legumes / Fodder plants / Fertilizers

Call No: 631.8 SEB

Lang: En

Recycling of atmospheric nitrogen for maintaining the nitrogen cycle in nature through the active participation of microbes, plants, and animals, as well as through the natural atmospheric phenomena constitute a comprehensive subject that draws scientific knowledge from various disciplines of science. In recent years, man in his endeavour for survival, has started to deliberately manipulate the recycling of all the so-called wastages to maintain the balance of nitrogen cycle in nature. This paper presents an overview of legumes restricted only to the legume-Rhizobium symbiosis, the oldest subject in the field of recycling atmospheric nitrogen. Pulses productivity is also briefly discussed.

077 Grant, P. J.; Clatworthy, J. N. 1985. **Methods of pasture establishment**. In Kategile, J. A. (ed.) *Pasture Improvement Research in Eastern and Southern Africa: proceedings of the workshop held on 17-21 Sep 1984 at Harare*. Ottawa, Ont: International Development Research Centre. 349-367p.

Keyword(s): Pastures / Grassland management / Africa

Call No: 636.08551 KAP

Lang: En

In this paper, the subject of pasture establishment has been considered from the aspect of the Third World countries which have limited resources of staff, finance, and facilities and where the need is to apply these resources to their greatest immediate advantage. Establishment of pasture plants was best studied by sowing seeds under the conditions they are likely to encounter in an agricultural practice and later counting the survivors. On a more theoretical level, establishment can, however, be regarded in three separate phases, germination, emergence, and the survival factors. This paper studies the likely effect on each of these phases. Practical considerations involved in the establishment of pastures are then discussed.

078 International Centre for Agricultural Research in the Dry Areas. 1988. **Pasture, Forage and Livestock Program: annual report 1988**. Aleppo: International Centre for Agricultural Research in the Dry Areas. 284p.

Keyword(s): Farming systems / Feed crops / Pasture management / Livestock management

Call No: 636.08551 INP

Lang: En

This book presents the annual report for pasture, forage and livestock programme based on three major guiding principles: sustainability of natural resources and farming systems, development of low input systems, and integration of crop and livestock production. Farming system approach is discussed in greater depth in Chapter One. Chapter Two shows how the ley farming system is sustained through seed dormancy, and Chapter Eight discusses the stability and productivity of grasslands. Almost the entire work is focussed on the integration of crop and livestock production. The use of cereal straw is given in Chapter Ten as one more example of research into crop/livestock integration. Developing a methodology for selecting pasture legumes and the process of nitrogen fixation by pasture legumes is discussed in the third and fourth chapters. Grazing management, selection of forage legumes and utilisation of forage legumes is discussed in the fifth, sixth, and seven chapters. Chapter Nine deals with soil and plant factors affecting the yield of cereal straw. The reports conclude with a description of the programmes, training, and international collaboration. A training case study is described. Finally, the recommendations of a workshop on the role of legumes in the farming systems of Mediterranean areas are presented.

079 Loch, D. S. 1985. **Commercial seed increase of new pasture cultivars: organization and practice**. In Kategile, J. A.

(ed.) Pasture Improvement Research in Eastern and Southern Africa: proceedings of the workshop held on 17-21 Sep 1984 at Harare. Ottawa, Ont: International Development Research Centre. 392-424p.

Keyword(s): *Feed crops / Pasture management / Seed production*

Call No: 636.08551 KAP

Lang: En

Pasture seed production technology is reviewed in the context of commercial increase following the release of a new cultivars. Particular emphasis is placed on the organisation and location of production, crop establishment, management, and harvesting and the role of research with brief notes on drying, processing, packing, storage, seed testing, and seed certification. The application of pasture seed production technology to the multiplication of commercial seed supplies after release is the main subject of this paper.

080 Moog, F. A. 1985. **Forages in integrated food systems.** In Blair, G. J.; Ivory, D. A.; Evans, T. R. (eds.) Forages in South Asian and South Pacific Agriculture: proceedings of an International Workshop held on 19-23 Aug 1985 at Cisarua, Indonesia. Canberra, ACT: Australian Centre for International Agricultural Research. 152-15p.

Keyword(s): *Feed crops / Cropping systems*

Call No: 633.2 BLF

Lang: En

Feeding of animals in mixed crop/livestock farming systems revolves around forages which include crop residues, weeds, tree leaves, and planted fodder crops. The kinds of crops grown, the intensity of cropping, and the extent of land utilisation, coupled with the environmental management factors, determine the availability of the above feedstuffs for livestock. This paper presents the value of cultivated food crops as a source of forage, and especially of grown forage species integrated with food crop production to support livestock. The paper also highlights the important role of weeds and the by-products from food crops as forage in upland and lowland rice cropping systems.

081 National Research Council (US). Board on Science and Technology for International Development. 1993. **Vetiver grass: a thin green line against erosion.** Washington, DC: National Research Council (US). Board on Science and Technology for International Development. Washington, DC: National Academy Press. 171p.

Keyword(s): *Grasses / Soil conservation / Species*

Call No: 581.52643 NAV

Lang: En

Soil erosion is among the most chronic environmental and economic burdens for developing nations. By these processes, huge amounts of valuable soil are being lost every day. Worse, the soil accumulates in rivers, reservoirs, harbours, estuaries, and other waterways where it is not required, is terribly destructive, and forbiddingly costly to remove. Erosion is thus a double disaster: a vital resource disappears from where it is desperately needed only to be dumped where it is equally unwanted. In this context, vetiver, a tropical grass is observed to offer one practical and inexpensive solution for controlling erosion simply, cheaply, and on a large scale in both tropical and semi-arid regions. This book makes a judgment on this point: to assess vetiver's promise and limitations and to identify any research that may be necessary before this grass can be deployed rationally, widely, and without undue environmental risk. In other words, this book evaluates the ecological advantages and potential risks in employing a grass that could eventually benefit watersheds, forests, and farms throughout the world's warmer zones. Basically, the book reviews the existing research and experiences conducted on the grass.

082 Pathak, N. N.; Jakhmola, R. C. 1983. **Forages and livestock production.** New Delhi: Vikas Pub. House. 274p.

Keyword(s): *Feed crops / Fodder plants / Forage / Animal production / Livestock management*

Call No: 633.2 PAF

Lang: En

In this book, an attempt has been made to organise relevant available information for providing comprehensive literature on the interrelationship of forages and livestock production. The book presents the status of farm animals in agriculturally advanced countries of the tropical and the subtropical zones with special reference to India. The subject of the book has been discussed in six chapters. In the first chapter historical background, present status of livestock, socio-agricultural system, and the future of animal husbandry development have been described. The future approach of forage production systems and resources are also discussed. In the second and third chapters forage resources, their production, conservation and storage have been given in detail. Special emphasis has been given to the care and management of grasslands, pastures and silvipastoral systems. The chemical composition of various forages available from different sources are described in Chapter Four. In the fifth chapter the feeding values of forages and their nutritional evaluation are presented. The most important aspect dealing with the potential of forages for livestock production is dealt in the sixth chapter.

083 Pickering, R. H.; Baughan, J. 1990. **Towards improved livestock training in technical schools.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 125-125p.

Keyword(s): *Livestock / Genetic improvement*
Call No: 630.72636 GAL 45 **Lang:** En

The article highlights the points to be improved in livestock training in technical schools.

084 Reed, J. D.; Goe, M. R. 1989. **Estimating the nutritive value of cereal crop residues: implications for developing feeding standards for draught animals.** ILCA [International Livestock Centre for Africa] bulletin (34):2-9

Keyword(s): *Animal nutrition / Cereals*
Call No: 636.05 ILB **Lang:** En

The analytical methods for the determination of the nutritive value of cereal crop residues are reviewed in this article, the emphasis being on methods used to estimate total plant cell wall and its digestibility. Examples are given of the accuracy of different methods in determining digestibility and the factors affecting it. Various management practices for feeding cereal crop residues to draught animals have been highlighted.

085 Rukhsana Anjum; Azra Barlas; Muhammad Afzal. 1987. **Integrated fish - crop - livestock production systems - problems & prospects.** *Progressive farming* 7(3):34-41

Keyword(s): *Agricultural production / Fish culture / Livestock*

Call No: 631.05 PRF **Lang:** En

An approach of integrating fish farming with animal husbandry and agriculture is practised to meet the present economic pressure for maximising food production and minimising production cost with a general concern for energy conservation. It is a multi-commodity framing system with waste recycling as the key feature and fish culture as the main activity. This paper focusses the problems and prospects regarding the integrated fish-crop-livestock production system. In this context, the advantages and disadvantages of fish farming are presented, followed by description of different farming systems integrated with fish farm. Constraints and prospects for the development of fish farming is also discussed.

086 Sainsbury, D.; Sainsbury, P. 1982. **Livestock health and housing.** London: English Language Book Society. 388p.

Keyword(s): *Livestock / Domestic animals / Animal health / Animal housing*

Call No: 636 SAL **Lang:** En

The growth and well being of all livestock are affected by three principal factors: their genetic make-up, their nutrition, and their climatic environment. In addition, the health status of the animals is of profound importance. If the stock are healthy they will be able to make full use of their genetic potential and their nutrition, but if pathogenic organisms are present they could fail in both above mentioned directions to exhibit their true capacities. This book deals with those factors, other than genetics and nutrition, that can influence the housed animal; the environmental needs of livestock, with emphasis on temperature, humidity, and air requirements; and practical and economic methods of housing to ensure that these requirements are met. In the intensive unit, the possible debilitating effects of sub-clinical disease on livestock, in ways not always obvious to the farmers, have been shown. From the veterinary standpoint, emphasis is given to the well being of animals and particular attention is given to the housing of livestock -- construction, ventilation, and thermal insulation of buildings -- since, good practice in these matters is the basis of satisfactory intensive management. Housing systems for all farm livestock are reviewed in detail, emphasising these systems' limitations vis a vis livestock and hygiene. Particular attention has been given to dairy and construction hygiene, to disinfection and to the provision of pure and wholesome water, and to the disposal of manure from farm buildings.

087 Sarma, J. S.; Yeung, P. 1985. **Livestock products in the third world: past trends and projections to 1990 and 2000.** (IFPRI research report, 49). Washington, DC: International Food Policy Research Institute. 87p.

Keyword(s): *Animal products / Developing countries / Livestock management*

Call No: 636 SAP **Lang:** En

The present report deals with livestock products based on research results which indicate the possible extent and location of future critical supply-demand imbalances in the third world. The research report also analyses the past trends in production, consumption, and trade in the principal livestock products, e.g., meats, milk, and eggs in the third world countries. Demand projections are based on the continuation of per capita income growth trends during 1966-77, which was a period of rapid income growth for the third world countries. Nevertheless, the results of the paper are thought to indicate the probable direction and the pace of future changes, though not necessarily their price magnitudes. The main conclusion of the report is that per capita

incomes grow rapidly in third world countries, even if output continues to grow at the past rates, the projected gaps between the demand and supply of meat and milk could be very large in all four developing regions during the period from 1990-2000. Thus, more intensified efforts are called for to accelerate production growth. It is only such detailed analysis of past trends that can throw light on prospects for the future. The report covers 104 developing countries divided into smaller geographical areas denoted as subregions and also into typologies based on per capita income and its growth.

088 Tung, L.; Balina, F. T. 1993. A methodological account on the introduction of vetiver grass (*Vetiveria zizanioides*) to improve an indigenous technology for soil and water conservation. Contour: newsletter of the Asia Soil Conservation Network 5(1):4-7
Keyword(s): Soil conservation / Water conservation / Traditional technology / Grasses / Sloping land

Call No: 631.4 CON

Lang: En

This article describes the role and importance of vetiver grass (*Vetiveria zizanioides*) in the improvement of an indigenous technology for soil and water conservation. The article is mainly based on the experiences of the authors working with the farmers to imbibe new technologies prevalent in the Philippines.

089 Tung, L.; Balina, F. T. 1993. A methodological account on the introduction of vetiver grass (*Vetiveria zizanioides*) to improve an indigenous technology for soil and water conservation. In World Bank. Vetiver grass: technical information network. Washington, DC: World Bank. v.1(55-60)p.

Keyword(s): Grasses / Soil conservation / Water conservation / Soil improvement

Call No: 633.202 WOV

Lang: En

This paper describes the role and importance of vetiver grass (*Vetiveria zizanioides*) for the improvement of an indigenous technology for soil and water conservation. The paper is mainly based on the experiences of the authors working with the farmers to learn new technologies.

090 World Bank. 1993. Vetiver grass: technical information package. Washington, DC: World Bank. 2v.(60+226)p.

Keyword(s): Grasses / Technical information / Information networks

Call No: 633.202 WOV

Lang: En

This publication consists of two volumes based on the report for vetiver information network. In the first volume, information has been put together on vetiver technology. The package includes three papers and one article. First paper is by M. Robert, on the description of the stabilisation of his farm in Natal, South Africa; this follows a photo extract from J. Greenfield's report on his recent visit to southern Africa; Paul Trung's experiments relating to salinity tolerance of vetiver; and, finally, an article by Ly Tung and F. T. Balina, copied from "Contour", on the findings of a small group of vetiver users in the Philippines is included. In the second volume, a progress report presented by P. K. Yoon provides the five main themes given under five separate parts in the portion: "Look-see at Vetiver". These parts are: production of quality, planting materials; establishment and management of quality vetiver hedgerows; use of vetiver grass as *in-situ* mulch in rubber plantings; uses of vetiver -- case studies; and observations to show special characteristics of vetiver hedgerows.

Bhutan

091 Bhutan. Ministry of Agriculture and Forestry. Animal Husbandry Department. 1985. Draft pasture policy: Bhutan. Thimphu: Bhutan. Ministry of Agriculture and Forestry. Animal Husbandry Department. 41p.

Keyword(s): Development policies / Feed crops / Livestock / Pastures / Bhutan

Call No: 636 AGD P

Lang: En

In Bhutan, on the basis of the work carried out on pastures, there is more improved pasture yields in the temperate and the sub-temperate areas. Whereas, in the alpine region the yield from pastures is not that good. Therefore, in the alpine regions, the result is expected to improve substantially with the implementation of the proposed pasture policy. This document presents the pasture policy of the Royal Government of Bhutan, Ministry of Agriculture and Forestry Animal Husbandry Department. Thirty-four policies on pastures have also been presented along with its implementation programme. Annex VI provides the Bhutan Forest Act 1969.

092 Gibson, T.; Gyamtsho, T. 1992. Agro-ecological zones and pasture species for Pema Gatshel district [Bhutan]. Bhutan journal of animal husbandry 13:1-6

Keyword(s): Pasture ecology / Ecological zonation / Agricultural ecology / Bhutan

Call No: 636 BHJ

Lang: En

The paper summarises the results of experiments and observations of pastures carried out in the farmers fields. The main physical environmental

characteristics of Pema Gatsel District have been divided into five important agro-ecological zones which are described on the basis of pasture species adaptability. Field observation to define these zones are given. A comparison of agro-ecological zones is made with other published classifications. On the basis of the results of a comprehensive testing programme and of observation in farmers' pastures, the best adapted pasture grasses and legumes are outlined for each zone.

093 Numata, M. 1990. **Observations of farmlands and pastures in central Bhutan.** In Numata, M. Ecology and conservation: the selected papers. Tokyo: Meiseikai. 209-224p.

Keyword(s): Pasture management / Farmlands / Bhutan

Call No: 574.5 NUE

Lang: En

A report on the preliminary observations made in Central Bhutan, particularly of its forest, grasslands, and farmlands is presented in this paper. Gradual change in vegetation from natural to secondary forests, from forests to grasslands, particularly pastures, and from natural and semi-natural vegetation to farmlands or plantations is also documented in this paper, with special reference to plants found in farmlands and grasslands.

094 Roder, W. 1990. **A review of literature and technical reports on grassland and fodder in Bhutan.** Thimphu: UNDP / Kathmandu: Himalayan Pasture and Fodder Research Network. 52p.

Keyword(s): Technical reports / Feed crops / Bhutan

Call No: 633.2 ROR

Lang: En

This document presents in two parts an overall review of literature and technical reports on grasslands and fodder found in Bhutan. The first part covers the review of literature and technical reports on livestock and its production, fodder resources, ecological conservation aspects, research and development, extension programmes, and seed multiplication. While, in the second part, documentation and dissemination of information regarding the mechanisms, on institutions, agencies and scientists and linkages with national centres are presented.

China and the Tibetan Plateau

095 Holder, F. G.; Louws, K. W.; Forestier, M.; Kernick, M.; Weber, F. 1985. **Erosion control and development through forestry and pasture in Xiji county: interim evaluation of project - China.** Rome: FAO. World Food Programme. 55p.

Keyword(s): Pastures / Food supply / Soil conservation / Forestry development / China

Call No: 631.45 HOE

Lang: En

This document presents the project report which provides consolidating information on the programme carried out for erosion control and development through forestry and pastures in Xiji County, Ningxia Hui Autonomous Region of China. It describes the process of implementation of the programmes and its achievements followed by the government contribution in implementing the programme. Finally, the recommendations are provided for the future development of pasture and forestry and suggestions to control soil erosion.

096 Horne, P. M.; Macleod, D. A.; Scott, J. M. 1992. **Forages on red soils in China: proceedings of a Workshop held on 22-25 Apr 1991 at Hunan Province, China.** (ACIAR [Australian Centre for International Agricultural Research] proceedings, 38). Canberra, ACT: Australian Centre for International Agricultural Research. 141p.

Keyword(s): Forage / Red soils / Pasture management / Soil types / China

Call No: 633.2 HOF

Lang: En

The red soils region of south central China have been the focus of recent research as it encompasses large under-utilised areas, and wastelands which could be developed for both upland cropping and animal enterprises. However, the region presents some difficult and unique problems in relation to soils, climate, land tenure, transportation, and marketing. The various papers presented in the proceedings discuss particular problems on forages on red soils in China and suggest directions for future research. It also represents the discrete discipline in the areas of soil science, forage agronomy, climatology, animal husbandry, forestry, sociology, and agricultural economics; and much of the discussion have been focused on integration of this knowledge into the development of sustainable agricultural systems for upland areas. The proceedings include a keynote address and 28 technical papers kept under seven headings: climatic resources, soil characteristics, forage characteristics, approaches to soil conservation, socioeconomics, current land use patterns, and current research. Additionally, working groups reports on soils and forages and farming systems are also provided in this volume.

097 Huang Wenhui; Nie Zhongnan. 1992. **Grassland development on red-yellow soils in Hubei province [China].** In Horne, P. M.; MacLeod, D. A.; Scott, J. M. (eds.) Forages on red soils in China: proceedings of a Workshop held on 22-25 Apr 1991 at Hunan province, China. (ACIAR proceedings, 38). Canberra,

ACT: Australian Centre for International Agricultural Research. 114-116p.

Keyword(s): *Grassland management / Red soils / China*

Call No: 633.2 HOF

Lang: En

Red-yellow soils are widely distributed in various parts of the world. In China, these soils are most common. Generally, red-yellow soils are classified as laterite, red earth or yellow earth according to their nature and form. A large proportion of the red-yellow soil group in Hubei is yellow earth, which occurs in the western mountains, northern hillocks, and central hills. The red earths occur mainly in the low mountains and hills of south-eastern Hubei, although they do occur less frequently in the rest of the province. The red-yellow soils are not ideal for growing crops due to their low pH, low organic matter content and poor structure. Yet, despite major constraints to improved production, successful experiments have been conducted for the establishment of pastures. This paper highlights the experiments and results conducted for the development of grasslands on red-yellow soils in Hubei Province, and discusses the problems and strategies required for its future development.

098 Hwang Miao Young; Dun Lan Xiang; Zhang Ching Zhe. 1985. **The main varieties of forages and their evaluation in southern China.** In Blair, G. J.; Ivory, D. A.; Evans, T. R. (eds.) *Forages in Southeast Asia and South Pacific Agriculture: proceedings of an International Workshop held on 19-23 Aug 1985 at Cisarua, Indonesia.* Canberra, ACT: Australian Centre for International Agricultural Research. 76-79p.

Keyword(s): *Feed crops / Species / Fodder plants / China*

Call No: 633.2 BLF

Lang: En

The Guangdong province is located in the most southern part of China. Although the rainfall is less during winter, there is sufficient water for agricultural crops and forage production. This paper discusses the use of main varieties of native grasses found in Guangdong province along with brief information on the use of improved pasture species and that of some cultivated forages and crop residues. Finally, on the basis of past experience with native and introduced forages some topics for future research have been emphasised.

099 Jia Shenxiu. 1985. **Discussion on grassland regionalization in China.** *Natural resources* (2):1-13

Keyword(s): *Grasslands / Vegetation / Grassland management / China*

Call No: 333.7 NAR

Lang: Ch

100 K. Xie; J. Zhang; Horne, P. M. 1992. **Potential and problems for forage development and animal production in the red soils region of southern China.** In Horne, P. M.; MacLeod, D. A.; Scott, J. M. (eds.) *Forages on red soils in China: proceedings of a Workshop held on 22-25 Apr 1991 at Hunan province, China.* (ACIAR proceedings, 38). Canberra, ACT: Australian Centre for International Agricultural Research. 11-14p.

Keyword(s): *Forage/Red soils/ Soil types / Pasture management / Animal production / China*

Call No: 633.2 HOF

Lang: En

The most difficult challenge facing China today is that of feeding an expanding population with a limited supply of arable land. The enormity of this problem has focused national attention on the redevelopment of wastelands for agricultural use. The potential of the eroded hills for growing forages had not been recognised until recently and, therefore the ruminant animal production has remained low. Thus, forage development on the barren hills and mountains would create a source of feed for ruminant animals in areas that are currently poorly utilised. This paper highlights the potential for forage development and discusses the problems limiting forage development with reference to animal production in the red soils region of Southern China.

101 Leng Shilin; Lu Xuedu; Li Yue. 1992. **Agroclimatic resources and forage adaptability in the red soils region of south central China.** In Horne, P. M.; MacLeod, D. A.; Scott, J. M. (eds.) *Forages on red soils in China: proceedings of a Workshop held on 22-25 Apr 1991 at Hunan province, China.* (ACIAR proceedings, 38). Canberra, ACT: Australian Centre for International Agricultural Research. 15-21p.

Keyword(s): *Agroclimatology / Forage / Red soils / Fodder plants / China*

Call No: 633.2 HOF

Lang: En

South of central China covers a very large red soils region, which is dominated by hills and plains. The region has a climate characterised by four distinct seasons; unevenly distributed in late summer and autumn; a short cold period in winter and a long hot period in summer. There are sufficient thermal resources, rainfall and solar radiation for the production of many crops and forages. However, the potential is limited by occasional very low temperatures, overcast winter days, drought, waterlogging, strong winds, and hail. The characteristics of the region's agroclimatic resources are described in this paper from data collected on ten sites within the region and six sites outside, but adjacent to the region. This is followed by descriptive information

on forage adaptation to the agroclimate of the region and climatic potential productivity of forages.

102 Scott, J. M. 1992. **Principles of forage establishment for the upland red soils.** In Horne, P. M.; MacLeod, D. A.; Scott, J. M. (eds.) *Forages on red soils in China: proceedings of a Workshop held on 22-25 Apr 1991 at Hunan Province, China.* (ACIAR proceedings, 38). Canberra, ACT: Australian Centre for International Agricultural Research. 64-69p.

Keyword(s): *Forage / Fodder plants / Hills / Red soils*

Call No: 633.2 HOF

Lang: En

Pasture establishment can be risky and expensive. In order to minimise this risk and cost, it is necessary to understand the limitations which constrain establishment and how one can overcome these limitations. Pasture establishment can be described as the entire process of germination, emergence, seedling growth, and survival until a stable population is achieved. But forage establishment can be limited by a large range of factors. Some of the main factors limiting the establishment of forage in the upland red soils are described in more detail in this paper, under the headings of environmental, soil, biological, and management constraints.

103 Tu Mingyi. 1992. **Forest development in upland grasslands in south China.** In Horne, P. M.; MacLeod, D. A.; Scott, J. M. (eds.) *Forages on red soils in China: proceedings of a Workshop on ... held on 22-25 Apr 1991 at Hunan Province, China.* (ACIAR proceedings, 38). Canberra, ACT: Australian Centre for International Agricultural Research. 86-87p.

Keyword(s): *Forestry development / Grasslands / Hills / China*

Call No: 633.2 HOF

Lang: En

Trees can play an important role in maintaining stable grassland systems. Forests modify climate, conserve water and soil, and therefore extend benefits to livestock. In many countries, the irrigation of trees into animal production systems is well-advanced through afforestation of grassland areas and the benefits are now well documented. In China, this approach is in its infancy but with the rapid development of grass-fed livestock enterprises it is paramount that forestry practices are given due emphasis, which have been discussed in this paper, with detail information on four experiments of forestry trials and recommendations for their improvement.

104 Tu Xiu Liang; Luo Shi Ming. 1994. **Research on the competitive relationship**

between introduced forage species and local weed species in the uplands of south China. *Asia-Pacific uplands: a newsletter for scientists* (4):6-8

Keyword(s): *Forage / Species / Weeds / China*

Call No: 333.716 ASP

Lang: En

To highlight the competitive relationship between introduced forage species and local weed species in the uplands of south China, this paper presents important findings obtained from the research carried out for that purpose. Quadratic methods have been used to find the coverage, density and height of each species together with the management methods for land preparation measure, time and density of sowing, dosage of fertiliser applied, loading density of cattle or cutting intensity.

105 Xiao Ze-hong; Peng Ke-lin. 1992. **The agricultural potential of red soils in southern China and the role of forages.** In Horne, P. M.; MacLeod, D. A.; Scott, J. M. (eds.) *Forages on red soils in China: proceedings of a Workshop held on 22-25 Apr 1991 at Hunan Province, China.* (ACIAR proceedings, 38). Canberra, ACT: Australian Centre for International Agricultural Research. 112-113p.

Keyword(s): *Agricultural management / Forage / Red soils / Soil conservation / China*

Call No: 633.2 HOF

Lang: En

Red soils are the predominant soils for agriculture in southern China. Large areas of red soils occur in mountainous regions and can only be used as forest or pasture land. In the hill regions, however, the high population densities and a shortage of cultivated land, have prompted interest in the agricultural development of these soils. Utilisation of red soils in the hill regions has great potential, but includes low soil fertility, seasonal drought, poor crop varieties and inappropriate farming techniques. Forages have an important role to play in improving soil fertility and conserving soil moisture, which have been briefly described in this paper.

106 Xie Wei-min. 1992. **Developing the pastoral industry on the red soils region of Jiangxi province [China].** In Horne, P. M.; MacLeod, D. A.; Scott, J. M. (eds.) *Forages on red soils in China: proceedings of a Workshop held on 22-25 Apr 1991 at Hunan Province, China.* (ACIAR proceedings, 38). Canberra, ACT: Australian Centre for International Agricultural Research. 117-120p.

Keyword(s): *Pasture management / Red soils / China*

Call No: 633.2 HOF

Lang: En

Jiangxi Province is located in the middle of the subtropics and consists of red soil hills and an

appropriate climate. On account of the favourable climate, the potential for developing animal husbandry in Jiangxi Province is very high, which is discussed in this paper with special reference to livestock production and development, and the impediments to pastoral and forage development. In summary, the key to increase livestock production in Jiangxi Province will be the development of pastures through crop rotations matched to the potential of the various landscape types in order to increase both the quantity and quality of feed available to livestock.

India

107 Bhargava, B. 1991. **Fodder and pasture development in U. P. hills: practical problems and implementation.** In Society for Himalayan Environmental Rehabilitation & Peoples' Action. Livestock development in the Himalayan regions of India. Lucknow: Society for Himalayan Environmental Rehabilitation & Peoples' Action. v.2(118-131)p.

Keyword(s): *Feed crops / Pasture management / India, UP*

Call No: 636 SHL

Lang: En

The main cause of low productivity of livestock in hill areas is attributed to a large gap in the requirement and the availability of forage. Livestock husbandry as a whole is facing great nutritional problems everywhere due to shortage of nutritious forage and high cost of concentrates. Thus, there is an increased pressure on the available or existing pastures which are losing their capacities and usefulness by continuous over-grazing by the livestock which prefers selective grazing of succulent nutritious varieties thereby leaving less nutritious ones which get opportunity to produce seeds. This paper summarises the main reasons for deteriorations in the conditions of fodder and pasture and its development and implementation practice.

108 Billore, S. K.; Reddy, K. V. 1988. **Feasibility of nitrogen removal from municipal waste-water by application to land covered with a fodder grass.** In Agarwal, S. K.; Garg, R. K. (ed.) Environmental issues and researches in India. Udaipur: Himanshu Publications. 293-304p.

Keyword(s): *Waste waters / Water pollution / Feed crops / India*

Call No: 304.2 AGE

Lang: En

One of the most serious problems faced by mankind today is the problem of water pollution. Municipalities are constantly thinking of ways to achieve the best disposal of municipal waste water. The present paper discusses the land treatment which is defined as the controlled application of waste water

on the land surface to achieve a designed degree of treatment through natural physical, chemical, and biological process within the plant-soil-water matrix. The raw municipal waste water contains an excess of nitrogen and hence to use it for crop irrigation instead of direct-discharge to surface waters has become an established practice, which has been described in this paper. *Sorghum vulgare* has been considered as a promising fodder grass in this paper to assess the suitability of nitrogen removal from municipal waste water as it flows through the plant-soil-matrix.

109 Chatterjee, B. N.; Das, P. K. 1989. **Forage crop production: principles and practice.** New Delhi: Oxford and IBH Pub. 484p.

Keyword(s): *Grassland management / Feed crops / India*

Call No: 633.2 CHF

Lang: En

In this book the authors endeavoured to take the pioneering attempt in India to describe agronomic characteristics, plant growth, reproductive development and seed production of graminaceous and leguminous forage crops on the one hand, and to assess their value in terms of animals productivity, fertility building and their fitness in the present day intensive cropping systems, on the other hand. Here, the authors describe the plant-animal-soil interactions both in tropical and sub-tropical grasslands and forage crop production. Research information on fodder trees under agroforestry and silvipasture systems have also been elucidated. The book also covers topics such as natural grasslands and their management, forage agronomy with reference to propagation, fertiliser management, irrigation management, weed control, and so on.

110 Ghosh, S. B. 1994. **Fodder grasses of Indian sanctuaries I - identification of grasses consumed by herbivores, in the Mahananda and other wildlife sanctuaries of north Bengal.** The Indian forester 120(10):946-952

Keyword(s): *National parks / Fodder plants / Grasses / India*

Call No: 634.9 INF

Lang: En

This paper presents the information on the fodder grasses of Indian sanctuaries which are consumed by the herbivores, in the Mahananda and other wildlife sanctuaries of northern Bengal. Number of grasses have been identified and listed in this paper. Among them, plants having underground, enormous, drought-resistant rhizome, are suggested to be suitable for plantation purposes and restoration of grasslands. Mixed plantations have been recommended and growth of dicot weeds are detected and are recommended to be eradicated to protect the savannah grasslands.

111 Kelley, T. G.; Rao, P. P.; Walker, J. S. 1993. **The related value of cereal straw fodder in the semi-arid tropics of India: implications for cereal breeding programmes at ICRISAT.** In Dvorak, K. A. (ed.) Social science research for agricultural technology development: spatial and temporal dimensions. Oxon: CAB International. 88-105p.

Keyword(s): *Tropics / ICRISAT / Straw / Animal feeding / India*

Call No: 630 DVS

Lang: En

Fodder trees and forage species play an important role in meeting the draught and milk animals' feed requirements of mixed crop-livestock farming systems in the semi-arid tropics, but their contribution is clearly limited, particularly during the dry season. Thus, there is a heavy dependence on crop residues in managing fodder requirements at the farm level. Cereal crop residues is the main feed resource in crop-livestock systems in India. The relative contribution by sorghum straw to the total value of production, and their increasing value over time relative to grain are discussed in the first section of this paper. Sorghum grain and fodder price ratios are used to illustrate the increasing relative importance of fodder over time in the second section. In the third section, cereal breeding strategy is discussed in the light of grain yield versus total value of production criteria. The trade-off between grain and fodder yield is also examined. The fourth section examines the evidence on adoption of improved cultivars of coarse cereals in semi-arid tropics in India. This is then followed by discussion and conclusion.

112 Melkania, N. P.; Tandon, J. P. 1985. **Dry matter yield and strategies for regeneration of pastures in central Himalaya.** In Singh, J. H. (ed.) Environmental Regeneration in Himalaya: concept and strategies - reports from the seminar on Environmental Regeneration in Himalaya: concept and strategies held on 24-26 Oct 1983 at Nainital. Nainital: The Central Himalayan Environment Association / Nainital: Gyanodaya Prakashan. 399-409p.

Keyword(s): *Himalayas / Grasslands / Pasture management / Feed crops*

Call No: 304.2 SIR

Lang: En

The Central Himalayas are classified as permanent pastures and grazing lands as the forest lands and grasslands are used for grazing and hay production. With the burgeoning bovine population, the grass cover displays signs of deterioration. This, in turn, has caused a decline in the productivity of livestock and also a decline in the productivity of cultivated lands in many ways. Except for the alpine pastures, the grasslands in the Himalayas have originated due to abandoned cultivation and deforestation. This paper

provides information on the number of species found in the Central Himalayas, and their composition along with the dry matter yield and their nutritive value. The socioeconomic and ecological problems of the grasslands and different measures for increasing the production have also been discussed. This paper thus, discusses the dry matter yield, and strategies for regenerations of pastures in the Central Himalayas.

113 Nautiyal, A. R.; Thapliyal, P.; Purohit, A. N. 1987. **A model for round-the-year supply of green fodder in hills.** In Pangtey, V. P. S.; Joshi, S. C. (eds.) Western Himalaya: environment problems & development. Nainital: Gyanodaya Prakashan. 725-731p.

Keyword(s): *Animal nutrition / Feed crops / Hills*

Call No: 551.431 PAW

Lang: En

Fuel and fodder are two most important requirements of the mountain societies, and these are met from the forests. But with increasing population the pressure on the fast-depleting forests is building, thus, a larger number of mountain villages face acute shortage of fuel and fodder. This paper discusses a combination of tree species growing naturally in the mountains, which provides a regular supply of green fodder throughout the year.

114 Purohit, K. 1991. **Some problems related to production and availability of fodder and feeds in the hills.** In Society for Himalayan Environmental Rehabilitation & Peoples' Action. Livestock development in the Himalayan regions of India. Lucknow: Society for Himalayan Environmental Rehabilitation & Peoples' Action. v.2(167-171)p.

Keyword(s): *Feed crops / Hills*

Call No: 636 SHL

Lang: En

Herdsmen depend, for forage requirements of their livestock, on pastures and shrub leaves, crop residue and so on. Different types of land and forests, fringes of agricultural land, canal embankments, and alpine areas, provide grazing areas, which are overpopulated and overgrazed and do not meet even the requirements of their local livestock. This paper scans out some of the problems related to production and availability of fodder and feeds in the hills. Some strategies, suggested for their improvement have also been briefly highlighted.

115 Rangnekar, D. V. 1988. **Availability and intensive utilization of sugarcane by products.** In Devendra, C. (ed.) Non-conventional Feed Resources and Fibrous Agricultural Residues: Strategies for Expanded Utilization -

proceedings of a consultation held on 21-29 Mar 1983 at Hisar. Ottawa, Ont: International Development Research Centre / New Delhi: Indian Council of Agricultural Research. 76-93p.

Keyword(s): *Animal feeding / Sugarcane / Agricultural wastes*

Call No: 636.085 DEN

Lang: En

Sugar production is emerging as one of the prime agro-industries in India. The special characteristics of this crop renders it a choice for the farmer in irrigated areas. It is one of the best converters of solar energy and is capable of achieving high yields if managed properly. The paper highlights the place of the sugar industry in the rural economy, the emergence of the co-operative sector and integration of sugar and milk production with reference to sugarcane tops, molasses, and bagasse. The nutritive value of these by-products, their utilisation and the factors limiting their utility are briefly reviewed. The by-products are low in starch, protein, some minerals and lipids. However, they are available at low cost and can be profitably utilised where there are feed shortages. Different ways of utilising the by-products are described and future approaches recommended. Developing appropriate methods of ensiling along with supplementation and processing to improve the quality of sugarcane tops, particularly during the harvesting season is strongly recommended.

116 Shankarnarayan, K. A.; Shankar, V. 1984. **Grasses and legumes for forage and soil conservation.** New Delhi: Indian Council of Agricultural Research. 155p.

Keyword(s): *Grasses / Feed crops / Soil erosion / Soil conservation / India*

Call No: 633.2 SHG

Lang: En

: Grasses and legumes are valued as forages and for their role in controlling soil erosion. Information on the dual role of grasses and legumes remain diffused in literature and it becomes a formidable task to collect and put them in a proper perspectives. This book is thus, a compilation of information to present a synthetic picture of the varied roles that grasses and legumes play in forage production and soil conservation under various ecological conditions. The book contains four main portions. The first part deals with the current problem and projections including the ecological conditions and national efforts. The second part deals with information regarding grasses and legumes for soil conservation. Information on forages for livestock is discussed in the third part. While, forage production in high hills and temperate zone is described in the fourth part. The fifth part deals with various subjects which require research in the near future for its development.

117 Singh, P. 1991. **Pasture and livestock production from Himalayan region.** In Society for Himalayan Environmental Rehabilitation & Peoples' Action. Livestock development in the Himalayan regions of India. Lucknow: Society for Himalayan Environmental Rehabilitation & Peoples' Action. v.2(98-117)p.

Keyword(s): *Animal production / Pasture management / Himalayas*

Call No: 636 SHL

Lang: En

The treeless sub-alpine and alpine pastures are extensively grazed during summer. Presently, in most parts of the Himalayas, the grass species found here represent the third or fourth stage of degradation. In the case of the availability of leaf fodder, it has gone down drastically in the recent few decades due to the replacement of broadleaf varieties of pines and firs in certain areas by the needle-like leaves. Primarily food crops are raised and area under fodder crops is meagre. The grazing based animal husbandry has been the major source of livelihood of the hill people who are now facing the twin problem of fuelwood and pasturage. The present status of the pastures in the Himalayan range is presented in this paper which is followed by some important strategies required for the improvement of fodder production in the temperate and sub-temperate regions. Finally, the recommendations required for further development have been highlighted.

118 Singh, V. 1993. **Role of perennial forage crops for year-round forage supply in India.** Asian livestock 18(11):141-142

Keyword(s): *Forage / Animal feeding / Crops / India*

Call No: 636 ASL

Lang: En

The cropping patterns of forage and their role for year round forage supply in India is briefly discussed in this article.

119 Singh, V.; Sharma, R. J. 1990. **Forest, livestock, crop, human relationships and development of sustainable system: a Garhwal Himalayan case study.** In Parkash, R. (ed.) Advances in forestry research in India. Dehradun: International Book Distributors. v.5(211-245)p.

Keyword(s): *Mountain forests / Livestock / Crops / Human activity / Garhwal Himalayas*

Call No: 634.9072 PAA

Lang: En

This paper analyses and interprets the existing performance of the farming systems in Garhwal Himalayas and investigates a novel method to development. The Garhwal Himalayan food production system comprises forest, livestock, crops and human components, among which there is significant exchange of energy. The relationship

between these components and the energy flow through them have been analysed. Community forestry has been taken as the key factor for increasing the productivity of the system. Ways and means to develop an ecologically and economically sustainable farming system have also been discussed in detail.

120 Tewari, K. M. 1990. **Development of pasture land in Himalayas: an exploratory study.** In Biswas, S. K. (ed.) *Strategy of development in the Himalayas: a profile of socio-economic change.* Calcutta: Institute of Social Research and Applied Anthropology. 236-248p.

Keyword(s): *Pasture management / Himalayas / Development policy*

Call No: 330.9 BIS

Lang: En

Grasslands also cover fairly large areas in the Himalayan region. As no agricultural area could be allocated for fodder production, the grasslands in the Himalayan region play a very important role in feeding its large livestock population. The livestock in the Himalayan region is thus primarily maintained on grass and leaf-fodder forest areas supplemented by straw and stalks of agricultural crops. The grasslands in the Himalayan region thus serve as the base for livestock rearing. This paper reports on the development of pasture land in the Himalayas. The classification of the grasslands, management of the pasture lands, and major problems and recommendations required for the development of the pasture land are also given.

Nepal

121 Ebreqt, A. 1986. **Propagation of fodder grasses, legumes and fruit trees in Community Forestry Development Project.** (Project paper, 17). Kathmandu: Community Forestry Development Project. 30p.

Keyword(s): *Legumes / Fruit trees / Development projects / Community forestry / Feed crops / Forestry development / Nepal*

Call No: 634.96332 COF 36

Lang: En

The production and management of fodder, grasses, and legume is expected to alleviate grazing pressure on forest lands. The report in this document tries to give some suggestions and guidelines for the introduction of fodder, grasses, legumes, and fruit trees in the Community Forestry Development Project. The report is divided into three main chapters, beside the introduction. In the first chapter, summary on the species used for sites that have been afforested is given. This is followed by the use of fodder grasses/legumes and fruit trees, the present

agricultural systems in the hills of Nepal, that have possibilities for the introduction of fodder grasses and legumes is also described. In the second chapter, the possibilities for increasing fodder production, propagation of fodder grasses and legumes is discussed. Some ecological features of some fodder grasses and legumes are also provided. In the third chapter, the techniques of propagation of fruit trees is explained, followed by conclusion and recommendations.

122 Field, D. I.; Pandey, K. R. 1969. **Pasture fodder and livestock development: Trishuli watershed Nepal.** (Project report, 15). Kathmandu: Nepal. Ministry of Forests / Rome: FAO. 122p.

Keyword(s): *Feed crops / Pasture management / Livestock / Nepal, CDR, Nuwakot*

Call No: 333.716 TRW 23

Lang: En

123 Giri, M. K. 1990. **Fodder production in Nepal- a review.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 42-52p.

Keyword(s): *Fodder plants / Feed crops / Nepal*

Call No: 630.72636 GAL 45

Lang: En

Livestock production is a very important industry in Nepal, both on a national scale and for farming families. Yet, animal productivity is constrained by lack of fodder. The supply of fodder varies with the land physiography and season. Generally, fodder is obtained from cultivated and natural sources that depends on the local system of land use. This paper reviews the major sources of fodder in Nepal, along with total production and strategies to improve its production. Almost half the fodder for livestock is reported to come from the forest, and the rest obtained from crop residues. Other sources of fodder as mentioned are shrubland, terrace risers, fallow land, and fodder trees on farmland. Proper management of traditional sources of fodder as well as appropriate development of cultivated fodder are emphasised in order to increase in fodder production.

124 Gurung, O. P. 1987. **Interrelationships among pasture, animal husbandry and agriculture: case study of Tara.** (Natural resource management paper, 2). Kathmandu: Winrock International Institute for Agricultural Development. 21p.

Keyword(s): *Agriculture / Pastures / Animal husbandry / Nepal, WDR, Baglung*

Call No: 636.08551 GUI P

Lang: En

Agriculture is the mainstay of village economy in the hills of Nepal. It is based on the quality and quantity of the natural resources available. Pasture is one of the main components of livestock development and agricultural productivity. Because, agricultural productivity is dependent on the amount of manure produced by animals, and raising animals is dependent on the availability of pasture, animal husbandry and agriculture are inseparably intertwined. This document discusses the role of village communities in pasture management and analyses the interrelationship among pasture, animal husbandry, and agriculture in Tara village.

125 Harrison, A. 1989. **Results of a fodder species elimination trial at Lumle Agricultural Centre.** (LAC technical paper, 13). Pokhara: Lumle Agricultural Centre. 8p.

Keyword(s): Fodder plants

Call No: 630.7232 LUA 44

Lang: En

Results from a fodder species elimination trial planted on a typically poor site at Lumle Agricultural Centre (LAC) are presented in this document. The species planted were: *Prasiopsis glomeruleta*, *Prasiopsis hainla*, *Ficus neriifolia* var. *nemorialis*, *Ficus auriculata*, *Litsea monopetala*, and *Prunus cerasoides*.

126 Hopkins, N. 1983. **The fodder situation in the hills of eastern Nepal.** (APROSC Occasional Paper, 2). Kathmandu: Agricultural Projects Services Centre. 17p.

Keyword(s): Hills / Feed crops / Fodder plants / Nepal

Call No: 633.2 HOF P

Lang: En

Increasing human population is exerting increasing pressure on the natural resources of many developing countries. This paper describes and, where possible, quantifies the current situation of livestock in the Koshi Hills of eastern Nepal. The importance of livestock within the agricultural system is discussed and existing constraints to increasing livestock production are noted. Part of the paper is devoted to the nutritional aspect which is seen as a critical, too often neglected, area in the field of animal production. The energy situation with regard to fodder is described and calculated for three typical 'model' farms. The results show that it is the small landholdings which are under the greatest pressure and depend heavily on communal land. Finally, a number of ways of alleviating the fodder deficit situation are described.

127 International Fund for Agricultural Development. 1990. **Hills leasehold forestry and forage development project: kingdom of Nepal.** Rome: International Fund for Agricultural Development. 238p.

Keyword(s): Hills / Forest management / Forestry policies / Household income / Fuelwood / Leases / Nepal

Call No: 634.9 INK

Lang: En

The ecological crisis in the hills of Nepal, however is in no small measure the product of a crisis in the condition of production of the rural poor. No enduring solution to the ecological problems is conceivable without relieving the pressures that are driving the population into an unsustainable relationship with the environment. Against this background, the International Fund for Agricultural Development (IFAD) formulated a project focusing on the integration of forestry and livestock development centred on the leasing of blocks of degraded forest land groups of poor families in order to provide them with assured supplies of fodder, fuelwood, and other products such as timber and fruit. This document presents the appraisal report of the project which has identified and reported the potential areas of land for lease to the target group in the project districts. The requirements for strengthening the livestock support services is discussed and the technical packages and proposed institutional arrangements are reviewed. Background, financial requirements, organisation and management, benefits, justification and risk faced by the project and assurances are also given.

128 Jansen, A. 1991. **Fodder development in Palpa - private land.** Kathmandu: Palpa Development Programme. 46p.

Keyword(s): Feed crops / Nepal, WDR, Palpa

Call No: 633.2 JAF P

Lang: En

This report evaluates the approaches, technologies, ideas, and so on as described in Scheuermeier's "Fodder on private land". It has been divided into three parts. In the first part, evaluation of the first report is made. In the second part author's own experiences working on fodder in Palpa district are described. While, in the final part a suitable approach for fodder development in Palpa District, based on the foregoing programme is presented.

129 Kayasta, B. 1987. **Animal nutrition and pasture fodder management: the case of Mahaspur.** (Natural resource management paper, 5). Kathmandu: Winrock International Institute for Agricultural Development. 15p.

Keyword(s): Feed crops / Animal nutrition / Pasture management / Nepal, CDR

Call No: 636.085 KAA P

Lang: En

Agricultural economy of Nepal is a combination of crop cultivation and animal husbandry. Although these two activities are closely associated, each is dependent on a different resource. Crop cultivation is dependent on good land and livestock farming on pasture. Case study of Mahaspur village in Bara

district has been reported in this paper, providing information on the existing conditions of livestock farming, grazing, and pasture fodder management adapted by a rural community.

130 Khatri, D. B. 1986. **Fodder and pasture improvement and the Tarai Community Forest Development Project.** In Robinson, P. J. Proceedings of the first Meeting of the Working Group on Fodder Trees, Forest Fodder and Leaf Litter held on 23 Jun 1986 at Kathmandu, Nepal. (FRIC occasional paper, 3/87). Kathmandu: Nepal. Department of Forest. Forest Research and Information Centre. 24-25p.

Keyword(s): *Community forestry / Institutional framework / Feed crops / Pastures / Nepal*

Call No: 636.08551 ROP P

Lang: En

This article deals with the impact on the development of pasture, and different solution measures required for the improvement of fodder and pasture. A list of grasses and legumes is also provided.

131 Nield, R. S. 1985. **Fuelwood and fodder problems and policy: working paper for the Water and Energy Commission Secretariat (WECS).** Kathmandu: Nepal. Ministry of Water Resources. Water and Energy Commission Secretariat. 44p.

Keyword(s): *Land use / Feed crops / Energy policy / Afforestation / Development projects / Fuelwood / Feed crops / Nepal*

Call No: 333.793 NIF P

Lang: En

This paper presents the problems related with fuelwood and fodder management and discusses the feasible policy required for its management. Forest land area, its condition and management is described. Concepts and supply for the land resource base and its type is also described with general discussion on the constraints and its solution.

132 Pariyar, D. 1989. **Research needs in animal fodder crops.** In Yazman, J. A.; Oli, K. P. Proceedings of the Workshop on Research Needs in Livestock Production and Animal Health in Nepal held on 1-7 Jan 1989 at Kathmandu. Lalitpur: Nepal. National Agricultural Research and Services Centre. Central Livestock Development Centre. 65-69p.

Keyword(s): *Animal feeding / Feed crops / Nepal*

Call No: 636 YAP

Lang: En

Production of ruminant livestock is an important component of small farmer production systems in

Nepal. Compared to many other Asian countries, the number of animals per farm is quite large, but these receive enough feed only during the summer monsoon. As for the other seasons of the year, the ruminant livestock is under fed. This paper briefly highlights the feed situation in Nepal and discusses the areas which requires research in fodder crop production for the future. Appropriate varieties of fodder crops for a given region have also been suggested.

133 Pradhan, P. R. 1989. **Research needs in grasses and legumes.** In Yazman, J. A.; Oli, K. P. Proceedings of the Workshop on Research Needs in Livestock Production and Animal Health in Nepal held on 1-7 Jan 1989 at Kathmandu. Lalitpur: Nepal. National Agricultural Research and Services Centre. Central Livestock Development Centre. 59-64p.

Keyword(s): *Mixed farming / Feed grasses / Animal feeding / Nepal*

Call No: 636 YAP

Lang: En

The farming systems in Nepal are typically mixed systems with livestock and food crops comprising the two major components. But, livestock production is not a profitable enterprise on small farms due to low per head productivity resulting from shortages of forages. An obvious approach to increased ruminant livestock production on small farms is to increase the on-farm production of forages, particularly grasses, legumes, and fodder trees. This paper mainly deals with the reasons for increasing on-farm forage production is mainly dealt in this paper. Efforts to improve on-farm forage production is highlighted and areas requiring research and its importance for the production of forage is discussed.

134 Sertoli, A. 1988. **Report on a preliminary visit of Muktinath watershed basin and lower Kaligandaki valley (Mustang, Nepal) with particular reference to the development of Medicago falcata (Kote) seed production and integrated pasture/fodder research.** Kathmandu: Nepal. DLDH-Central Livestock Development Centre. 120p.

Keyword(s): *Seed production / Pasture management / Feed grasses*

Call No: 631.521 SER

Lang: En

This document compiles the reports of four programmes. The first two reports are based on the preliminary visit of the Muktinath Watershed Basin and lower Kaligandaki valley, in Bigu panchayat (Dolakha District) and adjacent pasture lands. The third report details out the initial implementation of *Medicago falcata* (Kote) seed production and integrated pasture/fodder research in Mustang Nepal. The last

report provides the information the preliminary observation and result on *Medicago falcata* (Kote) seed production. The document on the whole particularly pays attention to the natural resources and growing areas of *Medicago falcata* (Kote) and finalises towards the development of seed production and the formulation of an implementation programme. Field research activities programme, concentrating on plant evolution and multiplication is also discussed.

135 Shah, S. G. 1980. **Phewa watershed: animal husbandry and feed resource survey result and recommendations.** Kathmandu: Nepal. Ministry Forest and Soil Conservation. Department of Soil Conservation and Watershed Management. 130p.

Keyword(s): Watersheds / Animal husbandry / Feed crops / Nepal, WDR, Kaski

Call No: 333.716 PHT 2

Lang: En

Increasing effect of overgrazing on the natural resource of Nepal are becoming recognised as the major constraints of environmental degradation. Therefore, the best option available is to establish a well balanced livestock development programme emphasising increased nutrition, and farmers benefits from livestock without putting extra pressure on the environment. This document reports the results of an investigation done into the livestock situation at Phewa Watershed. It throws light on the existing animal husbandry and feed resource system seen at Phewa Watershed area and discusses the alternative measures and strategies for its development and management. The geographical situation of the Phewa Watershed Area has also been given.

136 Shrestha, N. P.; Chemjong, P. B.; Neupane, S. P. 1991. **Observations on the adaptability of Berseem as winter fodder in Koshi hill areas.** (PAC working paper, 16). Dhankuta: Pakhribas Agricultural Centre. 7p.

Keyword(s): Agricultural research / Feed crops / Nepal, EDR

Call No: 630.726332 SHO 45

Lang: En

This documents covers the report of the observation made on the adaptability and productivity of berseem as winter fodder in the Koshi hill areas of Nepal during the winter season under relay cropping.

137 Shrestha, N. P.; Neupane, S. P.; Gurung, H. B. 1990. **Observation on the adaptability and seed production of forage legumes at Pakhribas Agricultural Centre.** (PAC technical paper, 126). Dhankuta: Pakhribas Agricultural Centre. 7p.

Keyword(s): Feed crops / Seeds / Agricultural research

Call No: 630.7263152 SHO 45

Lang: En

This report covers the observation made on adaptability and seed production of forage legumes at Pakhribas Agricultural Centre (PAC). The report shows that some species were found to remain green even during winter season, playing an important role in meeting the green forage requirements for feeding animals. While, some species were observed to be better for the rainy season as they were found to be green only during this season.

138 Suelzer, R. (ed.) 1985 **Fodder and Pasture Development Workshop, TWP and partner projects: proceedings of the Workshop on Fodder and Pasture Development held on 29 Mar-3 Apr 1985 at Tansen, Nepal.** Kathmandu: Nepal. Ministry of Forests. Department of Soil Conservation and Watershed Management. 51p.

Keyword(s): Grazing land / Feed crops / Pasture management / Nepal

Call No: 333.7166332 TIW 1

Lang: En

This report is a working document. Necessarily, a workshop does not produce ready-made results, but brings together ideas, information, remarks and suggestions. This report presents the development of the proposals, hints to go on search for adapted solutions. Seven papers presented at the workshop have also been included that focused on the improvement of degraded grazing land, farm forestry, fodder production, low cost technology for hay-making, grazing management and pasture development.

139 Thapa, B.; Joshi, L.; Sherpa, S. L. 1990. **Fodder research and development activities at Pakhribas Agricultural Centre.** (PAC working paper, 15). Dhankuta: Pakhribas Agricultural Centre. 9p.

Keyword(s): Feed crops / Agricultural research / Nepal, EDR

Call No: 630.726332 THF 45

Lang: En

The past and ongoing fodder research and development activities carried out by the Forestry Section at Pakhribas Agricultural Centre are highlighted in this document. The research procedure adopted by the Forestry Section in planning, designing and implementation of fodder research programme is discussed. The need for a comprehensive, well coordinated fodder research programme at national, regional and local levels is urged.

140 Uprety, L. P. 1986. **Fodder situation: an ecological-anthropological study of Machhegaon, Nepal.** (Forestry research paper series, 5). Kathmandu: Winrock International Institute for Agricultural Development. 14p.

Keyword(s): *Feed crops / Forestry production / Nepal*

Call No: 636.08551 UPF P **Lang:** En

The hill economy of Nepal is based on agriculture and livestock farming, which are both dependent on the availability of natural resources and are inseparable. Livestock farming is totally dependent on the availability of fodder resources. Fodder resources, on the other hand, are extensively exploited and the shortage has a detrimental effect on the agrarian hill economy. This document discusses the role of livestock in the local economy of Macchegaon, fodder availability and villagers' participation in planting fodder trees on their farmland. The document also focuses on the present fodder crises and its effect on the local economy of Macchegaon. Finally, suggestions and measures for improving the Macchegaon fodder situation are provided.

Pakistan

141 A. Rashid; J. K. Khattak; M. Z. Khan. 1993. **Selection of halophytic forage shrubs for the Peshawar valley, Pakistan.** In Davidson, C. V.; Galloway, R. (eds.) *Productive use of saline land: proceedings of a Workshop held on 10-14 May 1991 at Perth, Western Australia.* Canberra, ACT: Australian Centre for International Agricultural Research. 56-61p.

Keyword(s): *Fodder plants / Species / Forage / Pakistan*

Call No: 333.73 DAP **Lang:** En

The economy of Pakistan is predominantly agrarian and the prosperity of the people depends upon the proper management of irrigated land and utilisation of vast and increasing areas of saline/sodic wasteland. Attempts to increase the productivity from marginal saline/sodic wastelands are being made. This paper aims to provide information on the trial made to test the suitability of 20 species of *Atriplex* and *Maireana* for fodder production in saline sodic soils near Peshawar. A provenance trial conducted in saline/sodic soils at Azahakhail, near Peshawar, in Pakistan, demonstrated that *Atriplex lentiformis* was the most productive of the 20 salt species tested. In the second provenance trial conducted at a neighbouring saline/sodic site at Ghudheri, where waterlogging and weed competition were not a serious problem, productivity of *Atriplex* and *Maireana* was markedly higher.

142 Abdul Wahid Jasra. 1994. **Fourwing saltbush: a potential forage technology in Balochistan, Pakistan.** *Asian livestock* 19(2):13-16

Keyword(s): *Forage / Rangelands / Grazing lands / Pakistan, Baluchistan*

Call No: 636 ASL

Lang: En

Current status of rangelands of Balochistan and potential forage species (Fourwing saltbush - *Atriplex canescens*) along with some recommendations for its improvement is highlighted in this paper.

143 DHV Consultants. 1991. **Guidelines for seed multiplication and propagation of grasses, legumes and fodder shrubs.** Amersfoort: DHV Consultants. Gilgit: Pakistan Forestry Dep. 53p.

Keyword(s): *Fodder plants / Grasses / Legumes*

Call No: 633.2 DHG **Lang:** En

These guidelines are full of information on seed multiplication and plant propagation techniques and characteristics and requirements of the different fodder species. It also provides sheets and forms to monitor the different activities and to administer the inputs and outputs. The contents of the guidelines are based on information from literature, experiences gained in the seed multiplication plots and on a version produced under the Malakand Social Forestry Project (MSFP).

144 Mian, M. A.; Rafiq, M. 1984. **Ecological zones for crops and livestock.** In Pakistan Agricultural Research Council. *Proceedings of Agricultural Research System Workshop held on 1-4 Sep 1983 at Dongagali, Pakistan.* Islamabad: Pakistan Agricultural Research Council. 16-23p.

Keyword(s): *Livestock / Agricultural ecology / Crops / Pakistan*

Call No: 630.72 PAP

Lang: En

The growth and development of any kind of crop or livestock have specific requirements which are fully or satisfactorily met only within certain ecological zones. This relationships of crops/livestock with the ecological zones are defined and elaborated in this paper. The actions required for agricultural research and extension, the two important aspects of agricultural development on the basis of ecological zones are discussed. Additionally, crop ecological zones are described in terms of physiography, climate, soils and drainage. Suggestions are given about the most suitable crops and cropping systems for each zone.

145 Pakistan Agricultural Research Council. [1984]. **National Forage and Fodder Research Programme 1982-83: salient achievement and progress.** Islamabad: Pakistan Agricultural Research Council. 119p.

Keyword(s): *Species / Fertilizers / Forage trees / Agricultural research / Feed crops / Pakistan*

Call No: 633.2 PAN

Lang: En

Silent achievements and progress of the national forage and fodder research programme are presented in this volume. Progress report for five institutions, one research centre, four forest departments and of one university have been included. Major constraints seen in fodder and forage research programme are presented and prospects for the future for the development of forage and fodder are discussed. Additionally, the objectives, and component unit work plan for range, forage and fodder crops are also provided.

146 R. H. Qureshi; M. Aslam; M. Rafiq. 1993. **Expansion in the use of forage halophytes in Pakistan.** In Davidson, C. V.; Galloway, R. (eds.) Productive use of saline land: proceedings of a Workshop held on 10-14 May 1991 at Perth, Western Australia. Canberra, ACT: Australian Centre for International Agricultural Research. 8-11p.

Keyword(s): *Fodder plants / Species / Land reclamation / Pakistan*

Call No: 333.73 DAP

Lang: En

Halophytes are plants which are capable of making good growth in saline soils. They range from grasses through shrubs to trees and occur in environments as diverse as coastal mangrove swamps, inland marshes and extensive arid plains. Halophytes not only possess high salt tolerance but, in some cases, are highly tolerant of waterlogging and in, others, of drought. Halophytes are relevant to the land degradation problem because they are capable of growing on salt-affected soils, waterlogged areas, sodic soils and arid areas. Moreover, halophytes in many cases are useful to mankind. This paper indicates the diversity of halophytes and their usefulness in different fields.

147 S. H. Hanjra; S. Rasool. 1993. **Potential of atriplex as a forage for livestock in Pakistan.** In Davidson, C. V.; Galloway, R. (eds.) Productive use of saline land: proceedings of a Workshop held on 10-14 May 1991 at Perth, Western Australia. Canberra, ACT: Australian Centre for International Agricultural Research. 68-70p.

Keyword(s): *Forage / Fodder plants / Animal feeding / Pakistan*

Call No: 333.73 DAP

Lang: En

In Pakistan, livestock production is an important component of agriculture, despite the fact animals are owned in herds too small to be of commercial value. The major limits to animal production are seasonal feed shortages both in winter and in summer, coupled with degradation of grazing lands, due to overgrazing, salinity, sodicity and waterlogging. *Atriplex* species have been used for increasing from salt-affected land in many countries and have great scope in Pakistan because of their ease of

establishment, simple requirements, high productivity, availability during periods of fodder scarcity and their acceptability to a wide range of ruminant classes. This paper highlights the potential of *Atriplex* as a forage for livestock in Pakistan.

Other Areas

148 Chatterton, L. 1988. **Medic ingredient in rangeland revival.** *Ceres: the FAO review* 21(3):36-39

Keyword(s): *Rangelands / Development projects*

Call No: 630.05 CEF

Lang: En

This paper presents the summary of the report on the rangeland programme carried out in Jordan. The purpose of the programme was to reverse the decline in the rangelands, showing significant results with a minimum of cost and disruptions.

Africa

149 Evans, T. R. 1985. **Management of forages to optimise animal production.** In Blair, G. J.; Ivory, D. A.; Evans, T. R. (eds.) *Forages in South Asian and South Pacific Agriculture: proceedings of an International Workshop held on 19-23 Aug 1985 at Cisarua, Indonesia.* Canberra, ACT: Australian Centre for International Agricultural Research. 147-151p.

Keyword(s): *Animal production / Feed crops / Grassland management*

Call No: 633.2 BLF

Lang: En

Majority of ruminants are owned by smallholders of Southeast Asia and South Pacific with farm areas ranging from less than 0.4 ha to 7.0 ha. Feed resources available are those from natural herbage on non-cultivated land, roadside verges, banks and rice field, crop residues and crop by-products. In some areas, forage is cut from under plantation crops or livestock are grazed on communal grazing lands. This paper considers the potential for improving forage resources and their utilisation in the smallholder context. Forage production, improving feed supplies, use of fertilizers for the improvement of feed quality and animal production and the requirements of different animals for different purposes have been discussed.

150 Kategile, J. A. 1985. **Pasture Improvement Research in Eastern and South Eastern Africa: proceedings of the workshop held on 17-21 Sep 1984 at Harare.** (IDRC, 237c). Ottawa, Ont: International Development Research Centre. 508p.

Keyword(s): *Feed crops / Pastures / Agricultural research / Africa*

Call No: 636.08551 KAP

Lang: En

The proceedings contains reviews by national scientists on pasture research carried out primarily in Eastern and South Africa. The application of the results obtained and lessons learned are highlighted and used in setting of national priorities for research methodologies are included in the proceedings. The research methods discussed are germplasm collections, storage and dissemination, and germplasm introduction and evaluation, nutritive evaluation of pastures, grazing experiments, and range monitoring. Specific guidelines on methodologies are outlined and these are useful to pasture agronomists, animal nutritionists, and range-management scientists. Two case studies of pasture-research regional networks in Asia and Latin America are presented and discussed. A strategy for future pasture research coordinated through a regional Pastures Network of Eastern and South Africa is presented.

151 Spear, P. T. 1985. **Animal experiments as a measurement of pasture productivity.** In Kategile, J. A. (ed.) *Pasture Improvement Research in Eastern and Southern Africa: proceedings of the workshop held on 17-21 Sep 1984 at Harare.* Ottawa, Ont: International Development Research Centre. 368-391p.

Keyword(s): *Feed crops / Pastures / Animal nutrition / Africa*

Call No: 636.08551 KAP

Lang: En

Pastures in Africa are usually grazed, therefore evaluations of pastures species and varieties including grazing experiments are described in this paper. The objectives of grazing experiments are clearly defined at the outset. Treatments selected to compliment the local farming practice as well as the productive potential of a pasture type in the environment is discussed. Animals grazing trials carefully selected and having sufficient genetic potential to reflect pasture productivity is explained. Finally, measurements of the productivity of both animals and pasture are presented.

152 Von Kaufmann, R. R.; Mohamed-Saleem, M. A. 1989. **Interactions between agronomy and economics in forage legume research.** ILCA [International Livestock Center for Africa] bulletin (35):22-27

Keyword(s): *Feed crops / Agronomy / Agricultural research*

Call No: 636.05 ILB

Lang: En

This paper highlights the interactions between agronomy and economics in developing forage production techniques for the two main land-use

situations in the zone, i.e., cultivation and fallow. Forage production techniques suitable for cultivated and fallow land in the subhumid zone of Nigeria are discussed. The paper shows that the integration of forage legumes into the farming systems benefited both soil fertility and structure. Undersowing, inter-row sowing and fodder banks have reported to be suitable methods of establishing forage legumes, requiring minimum inputs. The adoption of undersowing and inter-row sowing is reported to depend on the relative values of food grain and fodder. Dry-season supplementation with forage legumes from fodder banks is also reported to improve calf survival and helped reduce animal sales due to nutritional distress. Owners of fodder banks are reported to benefit from increased yields of cereal grown in rotation to combat nitrophilous grasses invading fodder banks over the years.

Asia

153 Blair, G. J.; Joory, D. A.; Evans, T. R. 1986. **Forages in Southeast Asian and South Pacific Agriculture: proceedings of an International Workshop held on 19-23 Aug 1985 at Cisarua, Indonesia.** (ACIAR [Australian Centre for International Agricultural Research] proceedings, 12). Canberra, ACT: Australian Centre for International Agricultural Research. 202p.

Keyword(s): *Feed crops / Fodder plants / Southeast Asia / Asia and the Pacific*

Call No: 633.2 BLF

Lang: En

Ruminant animals are an important component of the economic development of the southeast Asian and Southern Pacific regions. In many countries they are the main contributors to draught power, and are increasingly important as a source of meat, milk, and other livestock product. As the population increases and the economic development proceeds, consumption of meat derived from small and large ruminants is rising. The increase in consumption, together with increased demand for draught power resulting from crop intensification, poses a major challenge for national and international research agencies to improve the quality and quantity of the forage resources needed to provide for this demand for animal population. This proceedings include 31 papers presented at the workshop which focus on past, present, and future forage research activities in the southeast Asia and the southern Pacific regions.

154 Blair, G. J.; Orchard, P. D.; McCaskill, M. 1985. **Soil and climatic constraints to forage production.** In Blair, G. J.; Ivory, D. A.; Evans, T. R. (eds.) *Forages in Southeast Asian and Pacific Agriculture: proceedings of an International Workshop held on 19-23 Aug*

1985 at Cisarua, Indonesia. Canberra, ACT: Australian Centre for International Agricultural Research. 29-35p.

Keyword(s): *Soils / Feed crops / Climatic influence*

Call No: 633.2 BLF

Lang: En

Forage production in southeast Asia and the South Pacific is generally secondary to food cropping and is, therefore, relegated to the poorer soils with each soil group. Forage are often produced on areas that have been perturbed by man, to the extent that the topsoil has been removed and placed in food cropping areas. In the more favorable soils, forages are often grown in association with food and tree crops, so that an extra restriction on growth occurs from moisture and light competition. This paper has attempted to characterise the climatic constraints to pasture production in Java, and to illustrate the utility of a modeling approach in plant-climate studies. In this context, the paper focuses on the soil types of the region, their management policies, followed by climatic constraints to forage production, and description of the model use to calculate the meteorological data and its development. The results of the climatic variability and its impact in dry matter production are also discussed.

155 Devendra, C. 1988. **Strategies for the intensive utilization of the feeds resources in the Asian region.** In Devendra, C. (ed.) *Non-conventional Feed Resources and Fibrous Agricultural Residues: Strategies for Expanded Utilization* - proceedings of a consultation held on 21-29 Mar 1983 at Hisar. Ottawa, Ont: International Development Research Centre / New Delhi: Indian Council of Agricultural Research. 1-20p.

Keyword(s): *Agricultural wastes / Feeds / Waste utilization*

Call No: 636.085 DEN

Lang: En

Innovative feeding systems are needed that can demonstrate more economic animal performance, examples of which concern the use of various proteinaceous forages and urea-molasses block licks. Coupled with these, development strategies are urgently required that can stimulate large-scale on-farm testing of primary feedstuffs, backed by strong institutional support and wider resource use. The importance of large-scale on-farm feed utilisation merits the highest priority, and far outweighs the need for further documentation on pre-treatments of dry roughages and the beneficial effects of supplementation. These initiatives can significantly influence higher levels of productivity from animals, and also alleviate the search for efficiency in the intensive utilisation of the total feed resources in Asia. Strategies for the intensive utilisation of the feed resources in the Asian region are discussed in the

context of continuing inefficiencies, inadequate application of available knowledge, and potential possibilities of improving per animal performance. Effective utilisation of the crop residues, agro-industrial by-products, and non-conventional feed resources (NCFR) are reviewed in terms of priorities for use by animals. Improved efficiencies are justified by chronic feed deficit situations and need for economic animal production in South Asia. Optimum levels for the use of 16 NCFR as a guide to diet formulation are identified.

156 Mannelje, L. 't. 1985. **Forages in extensive grazing systems.** In Blair, G. J.; Ivory, D. A.; Evans, T. R. (eds.) *Forages in South Asian and South Pacific Agriculture: proceedings of an International Workshop held on 19-23 Aug 1985 at Cisarua, Indonesia.* Canberra, ACT: Australian Centre for International Agricultural Research. 161-163p.

Keyword(s): *Feed crops / Grazing lands*

Call No: 633.2 BLF

Lang: En

Grasslands are defined as vegetation types which consist of less than 40 per cent tree cover, with a grassy understory. These vegetation types are naturally associated with climates that have a fairly long dry season. The soils of such grasslands are usually of low fertility. The total area of permanent grasslands in southeast Asia and the western Pacific islands is about 14 millions hectares. This small area is almost completely an unimproved grassland, and considering the climate, a major undeveloped resource in this region. But it is characteristic for this region, that cattle and buffaloes are present in greatest concentration in districts which are intensively used for rice production and have little land under grasslands. These animals are fed forage cut from wastelands, by-products from arable crops and tree leaves. The aim of this paper is to investigate the possible role that undeveloped grassland areas could play in the production of food, assuming that the land is not suitable for production of arable crops.

157 Perkins, J.; Petheram, R. J.; Rachman, R. 1985. **Introduction and management prospects for forages in Southeast Asia and the South Pacific.** In Blair, G. J.; Ivory, D. A.; Evans, T. R. (eds.) *Forages in Southeast Asian and South Pacific Agriculture: proceedings of an International Workshop held on 19-23 Aug 1985 at Cisarua, Indonesia.* Canberra, ACT: Australian Centre for International Agricultural Research. 15-23p.

Keyword(s): *Feed crops / Animal feeding / Southeast Asia / Asia and the Pacific*

Call No: 633.2 BLF

Lang: En

Southeast Asia and the South Pacific cover a vast geographical area containing a great diversity of agricultural systems, ranging from slash-and-burn cultivation within original tropical rainforest to intensive livestock feedlots supplying the demands of urban centres. In this paper, heterogeneity, diversity, and specificity are emphasised throughout and, indeed, form the major threads of discussion. The physical location of forages and some major constraints seen in the forage development have been well discussed. Additionally, research based assistance for forage development is also discussed.

158 Reddy, M. R. 1988. **Complete rations based on fibrous agricultural residues for ruminants.** In Devendra, C. (ed.) *Non-conventional Feed Resources and Fibrous Agricultural Residues: Strategies for Expanded Utilization* - proceedings of a consultation held on 21-29 Mar 1983 at Hisar. Ottawa, Ont: International Development Research Centre / New Delhi: Indian Council of Agricultural Research. 94-111p.

Keyword(s): *Animal feeding / Fibre crops / Agricultural wastes*

Call No: 636.085 DEN

Lang: En

The complete diet system is a promising methods for improving the utilisation of fibrous agricultural residues in South Asia where most of the ruminants subsist on poor-quality crop residues. The concepts and advantages of complete rations and work done in various countries have been reviewed in this paper, including that in India where more than 60 per cent complete rations were formulated and processed into mash or pellets utilising locally available fibrous agricultural feed ingredients, and so on. The formulation tested in several experiments on crossbred cows, Murrah buffaloes, crossbred calves, and sheep for maintenance, milk production, and growth have been described. Cost of processing, nutrient digestibility and nutritive value of these rations are presented. The nutritional characteristics of these rations are summarised as a guide for ration formulation. Constraints referred to commercial exploitation of the technology have been presented for feeding systems. Finally, strategies for action for the promotion of promising feeding system is also presented.

159 Rika, I. K. 1985. **Forages in plantation crops.** In Blair, G. J.; Ivory, D. A.; Evans, T. R. (eds.) *Forages in South Asian and South Pacific Agriculture: proceedings of an International Workshop held on 19-23 Aug 1985 at Cisarua, Indonesia.* Canberra, ACT: Australian Centre for International Agricultural Research. 157-160pp.

Keyword(s): *Feed crops / forest plantations*

Call No: 633.2 BLF

Lang: En

So far, the area under plantation crops has generally not been used effectively for animal production because it is mostly covered by native grasses and shrubs or planted to cash crops. But now the farmers are managing the area under plantation crops in the traditional system, which uses the native forage for animal feeding. So if the utilisation of the area under plantation crops is increased by the introduction of improved pastures and then grazed by animals, the economic value will be increased and at the same time animal protein will be produced. This paper highlights the importance of utilising the area under plantation crops and prospects for forage in plantation.

160 Shelton, H. M.; Shir, W. W. 1991. **Forages for plantation crops: proceedings of a Workshop held on 27-29 Jun 1990 at Bali, Indonesia.** (ACIAR [Australian Centre for International Agricultural Research] proceedings, 32). Canberra, ACT: Australian Centre for International Agricultural Research. 162p.

Keyword(s): *Feed crops / Animal feeding / Plantation crops / Indonesia*

Call No: 633.2 SHF

Lang: En

The countries and population of Southeast Asia and the South Pacific are rapidly improving their economies and their demand for meat is increasing. There are few incentives for increased commercial ruminant production in many countries and animal products are usually produced as secondary by-products of other more important agricultural activities. However, the successful exploitation of these resources requires the availability of suitable forage species and management strategies. The proceedings include papers presented at the workshop that provide the information needed by extension workers and farmers to increase the productivity of ruminants in plantation crops. Altogether, 34 papers have been included under eight sections dealing mainly with new species, nutrition and quality, and compatibility of forages resources.

161 Toledo, J. N. 1985. **Forage research networking in tropical humid and subhumid environments.** In Blair, G. J.; Ivory, D. A.; Evans, T. R. (eds.) *Forages in Southeast Asia and South Pacific Agriculture: proceedings of an International Workshop held on 19-23 Aug 1985 at Cisarua, Indonesia.* Canberra: Australian Centre for international Agricultural Research. 69-75p.

Keyword(s): *Humid zone / Pastures / Feed crops / Farming systems*

Call No: 633. BLF

Lang: En

Together with recognition of plant-environment interactions and the concepts of stability and adaptability, the basic concepts of networking were developed in the agricultural sciences. Several of these network have also been very effective in establishing successful cooperation among and with national research programmes. The relative success of several cooperative research systems has resulted in recent proliferation of many so-called 'networks', very often established only on paper without any follow up, or with only minor options for effective contribution to the societies of involved nations. Therefore, several points to be considered in shaping and developing a pasture-forage research network within humid and subhumid ecosystems are discussed in this paper in an attempt to provide a guide for effective networking.

162 Topark-Nagrm, A.; Gutteridge, R. E. 1985. **Forages in Thailand.** In Blair, G. J.; Ivory, D. A.; Evans, T. R. (eds.) *Forages in South Asian and South Pacific Agriculture: proceedings of an International Workshop held on 19-23 Aug 1985 at Cisarua, Indonesia.* Canberra, ACT: Australian Centre for International Agricultural Research. 96-103p.

Keyword(s): *Feed crops / Fodder plants / Thailand*

Call No: 633.2 BLF

Lang: En

Although livestock population in Thailand is considered one of the most important farming activities, most of the available arable land is used for crop production, which is by far the largest agricultural activity. Cropping patterns, therefore, have a marked influence on forage supply, and crop residues form an important component of the diet of livestock. In addition, cropping patterns and therefore forage resources change from region to region throughout the country. The four regions of Thailand, based broadly on physiographic characteristics and climate are the central plain, the north, the northeast, and the south. In this paper, the role and evaluation of forages in each region have been reviewed separately. Adoption of improved techniques and future directions in the development of forage resources have also been discussed.

163 Turvey, N. D. 1994. **Afforestation and rehabilitation of Imperata grasslands in Southeast Asia: identification of priorities for research, education, training and extension.** (ACIAR [Australian Centre for International Agricultural Research] technical reports, 28). Canberra, ACT: Australian Centre for International Agricultural Research. 52p.

Keyword(s): *Afforestation/Rehabilitation/ Grass-lands/Grassland management/ Agricultural training/Agricultural research/ South East Asia*

Call No: 634.956 TUA

Lang: En

This paper highlights the edaphic, climatic, ecological, sivilcultural, agricultural, anthropological, socioeconomic, demographic and political problems associated with afforestation and rehabilitation of *Imperata* grasslands in Southeast Asia. In addition to research required to resolve problems, there is a need for the improvement of information transfer, education, training and extension to ensure programmes of establishing trees in *Imperata* grasslands, which are successfully identified and described in this paper.

164 Yoon, P. K. 1993. **A look-see at vetiver grass in Malaysia.** In World Bank. *Vetiver grass: technical information network.* Washington, DC: World Bank. v.2(226)p.

Keyword(s): *Grasses / Soil conservation / Technical information / Malaysia*

Call No: 633.202 WOV

Lang: En

In this second volume for Vetiver Information Network the progress report presented by P. K. Yoon is provided that concentrates on five main themes presented as five separate parts under the topic "Look-see at Vetiver". These are: production of quality planting material; establishment and management of quality vetiver hedgerows; use of vetiver grass as *in situ* mulch in rubber plantings; uses of vetiver-case studies; observations to show special characteristics of vetiver hedgerows. In general the report emphasises on planting quality materials and quality hedgerows. The results of the trial and other *ad hoc* observations carried out so far and the many feedback information have clearly shown that vetiver hedgerows have tremendous potentials for many areas of human activities.

Europe

165 Naveh, Z. 1986. **Pasture and forest management in the Mediterranean uplands.** In Finkel, H. J. (ed.) *Semiarid soil and water conservation.* Boca Raton, FL: CRC Press. 53-73p.

Keyword(s): *Hills / Pasture management / Forest management*

Call No: 631.45 FIS

Lang: En

This paper uses the ecological approach based upon an analysis of the history and prehistory of the nature and human forces affecting the landscape, and development of a programme for maximising benefits from correct land use of pastures and woodlands, consistent with the conservation and protection of the ecosystem. The Mediterranean uplands are described in considerable detail, as this is the region, above all others, where there is the longest available record of the effects of human intervention in the landscape-

forming processes. It is not only typical of many semi-arid regions, but may have special interest because it includes the land which is considered as the holy land by many people around the world. The paper has also attempted to point out the ecological features and shows how they can be used as part of conservation, ecologically sound management and improvement practices for the redemption of these uplands, not only for pastoral and sivicultural uses, but also for other multiple, socioeconomic and ecological benefits and above all, for upland soil and water conservation.

South America

166 Maeno, N. 1988. **Method to make a low cost grazing ground.** In Association for International Cooperation of Agriculture and Forestry. Useful farming practices. Tokyo: Association for International Cooperation of Agriculture and Forestry. 271-272p.

Keyword(s): *Pasture management / Grazing / Colombia*

Call No: 631 ASU

Lang: En

This article provides brief information on the technological description to make a low-cost grazing ground, its use and advantages.

167 Toledo, J. M.; Li Pun, H. H.; Pizarro, E. A. 1985. **Network approach in pasture research: tropical American experience.** In Kategile, J. A. Pasture Improvement Research in Eastern and Southern Africa: proceedings of the workshop held on 17-21 Sep 1984 at Harare. Ottawa, Ont: International Development Research Centre. 475-498p.

Keyword(s): *Pastures / Animal nutrition / United States*

Call No: 636.08551 KAP

Lang: En

Animal production and productivity are slow in tropical America in spite of its large number of cattle. The main constraint for animal production is the availability and quality of pastures. Considerable efforts have been spent on pasture research. However, its impact has been rare. Pasture research is a long and costly endeavour. At the same time, resources for research are becoming more scarce. This paper presents an overview of pastures research experiences, the activities of the International Tropical Pastures Network in Latin America and a scheme for an applied pasture research programme. Some suggestions for research schemes in national pastures research programmes have also been presented.

Tree Fodder, Agroforestry and Fodder Development

General

168 Amir, P. 1990. **Economic aspects of using shrubs and tree fodders to feed farm animals.** In Devendra, C. (ed.) *Shrubs and tree fodders for farm animals: proceedings of a Workshop held on 24-29 Jul 1989 at Denpasar, Indonesia.* Ottawa, Ont: International Development Research Centre. 331-339p.

Keyword(s): *Feed crops / Trees / Animal feeding / Economic aspects*

Call No: 636.085 DES

Lang: En

Shrubs and trees can play an important role in increasing feed supplies on small farms and among landless livestock owners. These feed sources are especially important during critical periods of feed shortage, such as during the dry season. Increasing shrubs and trees may reduce the pressure on farmers to unwillingly sell livestock because of feed shortage and, thus, receive a lower price. This paper attempts to lay out a simple economic analysis of using shrubs and trees, with special reference to small-scale farmers and landless and noncommercial producers. A framework is also outlined to evaluate the appropriate methods, data needs and approaches to on-farm testing and analysis of shrubs and trees in ruminant production.

169 Devendra, C. (ed.) 1990 **Shrubs and tree fodders for farm animals: proceedings of a Workshop held on 24-29 Jul 1989 at Denpasar, Indonesia.** Ottawa, Ont: International Development Research Centre. 349p.

Keyword(s): *Animal feeding / Feed crops / Animal nutrition*

Call No: 636.085 DES

Lang: En

This publication presents the results of an international meeting, that focuses on the use of shrubs and tree fodder by farm animals. It includes 26 papers, which describe and discuss feed-resource availability, use by ruminants and nonruminants, processing methodology, economics and development issues. These aspects and the current knowledge on shrubs and tree fodder are further highlighted by country case studies detailing prevailing situations and policy matters. The publication is divided into five sections followed by conclusions and recommendations. First section includes papers on the resources and second section covers papers on fodder use by farm animals. In the third section, papers on three strata forage system is highlighted. Papers on country case studies and

processing, methodology and economics are included in fourth and fifth sections.

170 Devendra, C. 1990. **The use of shrubs and tree fodders by ruminants.** In Devendra, C. (ed.) *Shrubs and tree fodders for farm animals: proceedings of a Workshop held on 24-29 Jul 1989 at Denpasar, Indonesia.* Ottawa, Ont: International Development Research Centre. 42-60p.

Keyword(s): *Feed crops / Trees / Animal feeding / Ruminants*

Call No: 636.085 DES

Lang: En

In this paper the potential value of shrub and fodder trees are discussed with reference to the range of feeds available and extent of their use by ruminants in developing countries. The discussion indicates that most of the information on hand relates to agronomic characteristics, rates of productivity, and chemical composition. The information on use by ruminants is generally sparse. Currently, shrubs and tree fodder have the greatest value in extensive systems in semi-arid and arid regions, especially for small ruminants. By comparison, fodder from trees are used as supplements for large ruminants. Following which the most widely used feed sources have been discussed. Additionally, the paper refers to potentially important feeding and development strategies which could increase the use of these feed resources and benefits the development of ruminant animals.

171 Ghani, A. N. A.; Awang, K. 1990. **Development and evaluation of agroforestry system for fodder production.** In Devendra, C. (ed.) *Shrubs and tree fodders for farm animals: proceedings of a Workshop held on 24-29 Jul 1989 at Denpasar, Indonesia.* Ottawa, Ont: International Development Research Centre. 319-330p.

Keyword(s): *Feed crops / Agroforestry / Farming systems*

Call No: 636.085 DES

Lang: En

Agroforestry, which integrates tree management, food production, and environmental conservation, has a potential role in rural development. This paper outlines how agroforestry systems that incorporate fodder production as a main objective can be developed. It focusses on the basic criteria to use, species selection, management practices, and the advantages and constraints involved. A method of evaluation and strategies for future consideration are also discussed.

172 Gutteridge, R. C.; Shelton, H. M. 1994. **Animal production potential of agroforestry systems.** In Copland, J. W.; Dijajanegra, A.; Sabrani, M. (eds.) *Agroforestry and animal production for human welfare: proceedings of an International Symposium held in association with the 7th AAAP Animal Science Congress on 11-16 Jul 1994 at Bali, Indonesia.* (ACIAR [Australian Centre for International Agricultural Research] proceedings, 55). Canberra, ACT: Australian Centre for International Agricultural Research. 7-16p.

Keyword(s): *Livestock management / Animal husbandry / Animal production / Agroforestry*

Call No: 634.9 COA

Lang: En

Animal production potential of agroforestry systems is reviewed in this paper. Factors influencing animal productivity including the forage contribution from tree and non-tree sources, competition between tree and understorey, compatibility between tree crop and animals, and the service role of the tree in ameliorating the microclimate of the animal, all have been discussed in this paper. Additionally, the range of successful systems in use have also been discussed. Animal productivity ranges from highly productive, in systems where the tree forms the primary source of forage for animals, and poorly productive, in silvopastoral situations where the animal is of secondary importance dependent on an underused resource within the system.

173 Limeangco-Lopez, P. D. 1990. **The use of shrubs and tree fodder by non-ruminants.** In Devendra, C. (ed.) *Shrubs and tree fodders for farm animals: proceedings of a Workshop held on 24-29 Jul 1989 at Denpasar, Indonesia.* Ottawa, Ont: International Development Research Centre. 61-75p.

Keyword(s): *Feed crops / Trees / Animal feeding*

Call No: 636.085 DES

Lang: En

The trend of increasing prices for animal feed has compelled researchers from developing countries to direct their research to non-conventional feeds, with particular emphasis on protein substitutes. The use of plant leaves as possible sources of protein is one among many possibilities. The first half of the paper deals mainly with the use of shrubs and tree fodders by non-ruminants with a short description on different species of leaf meals. Among the leaf meals, leucaena (*Leucaena leucocephala*) and cassava (*Manihot esculenta*) are considered most popular. The use of leaf meals as feed is limited by their high fibre content and, in some cases, the presence of toxic factors or metabolic inhibitors. The final half of

the paper concentrates on leaf protein xanthophyll concentrate which deals with the extraction of protein from the leaves to obtain a product high in protein, low in fibre, and without residual toxins. Finally, a short description on shrub and tree leaves used in small quantities as soilage for swine is also presented.

174 National Academy Press. 1984. **Leucaena: promising forage and tree crop for the tropics.** Washington, DC: National Academy Press. 100p.

Keyword(s): *Forestry / Fodder plants / Feed crops*

Call No: 634.9 NAL

Lang: En

Leucaena is a tropical tree with a wide assortment of uses. Increasingly, forests and farmers in the tropics are exploring its potential, and the area planted to leucaena is expanding rapidly. This report has detailed leucaena's potential value as a source of feed, fuel, and wood and its importance for solving deforestation problems in some tropical regions. Experience with leucaena is increasing very rapidly. However, more detailed information on site adaptability and cultivation practices is still needed which has also been recommended in this report.

Bangladesh

175 Saadullah, M. 1990. **Availability and use of shrubs and tree fodders in Bangladesh.** In Devendra, C. (ed.) *Shrubs and tree fodders for farm animals: proceedings of a Workshop held on 24-29 Jul 1989 at Denpasar, Indonesia.* Ottawa, Ont: International Development Research Centre. 221-236p.

Keyword(s): *Feed crops / Animal feeding / Bangladesh*

Call No: 636.085 DES

Lang: En

This paper highlights the importance of shrubs and fodder trees and their availability and patterns of use as animal feeds in Bangladesh. Shrubs and trees are regarded as good fodder sources in the country. Using shrubs, tree leaves, tender shoots, stems and twigs as feed for ruminants is a village tradition. The characteristics, types, and uses of common shrubs and fodder trees in the homestead, forest and common lands are discussed. Institutional support to compile a complete inventory of forage shrubs and trees is necessary as is the need for regulated lopping and grazing in the forest, homestead and common lands. Indiscriminate lopping often results in the death of desirable shrubs and trees. Special attention should also be directed to determine the nutritive

value of various feeds and the nature and extent of various toxic elements, which have all been discussed in this paper.

China and the Tibetan Plateau

176 Xu Zaichun. 1990. **Availability and use of shrubs and tree fodders in China.** In Devendra, C. (ed.) *Shrubs and tree fodders for farm animals: proceedings of a Workshop held on 24-29 Jul 1989 at Denpasar, Indonesia.* Ottawa, Ont: International Development Research Centre. 295-302p.

Keyword(s): *Feed crops / Trees / China*

Call No: 636.085 DES

Lang: En

This paper reviews information on the availability and use of shrubs and fodder trees in China. It is estimated that there are more than 400 species of shrubs and fodder trees in China, which could produce over a very large amount of fodder for animals. Their use is underestimated. Data are given on the nutrient contents of some tree leaves and on the use of feeds from *Pinus* species for egg production and use of *Robinia pseudoacacia* by pigs. Up to 10 per cent of *Leucaena leucocephala* leaf meal in the diet has been reported to be beneficial for pigs. The importance of developing shrubs and trees for fodder to keep pace with an anticipated expansion in animal production is emphasised.

India

177 Dwivedi, B. N. 1985. **Plantation of fuel and fodder species performance and promises.** In Singh, J. H. (ed.) *Environmental Regeneration in Himalaya: Concept and Strategies - reports from the seminar on ... held on 24-26 Oct 1983 at Nainital, India.* Nainital: The Central Himalayan Environment Association / Nainital: Gyanodaya Prakashan. 312-324p.

Keyword(s): *Himalayas / Plant production / Forest plantations*

Call No: 304.2 SIR

Lang: En

The increase in human and cattle population on the one hand and the shrinkage of forest area in the hills on the other hand, has created an acute scarcity of both fuel and fodder. This paper deals with the plantation of fuel and fodder species and the performances of the species screened on the basis of results obtained during the last five to six years. A large number of fodder and fuelwood species have

been tried, and their survival and growth behaviour have been recorded in nursery as well as in the field. *Grewia optiva*, *Desmodium nicaraguense*, *D. gyroides* and *D. tiliaefolium*, *Bauhinia purpurea* and *B. retusa*, *Boehmeria rugulosa*, *Leucaena leucocephala* var. K-8, *Oleaglandulifera*, *Acer oblongum* and *Gleditsia triacanthos*, among the fodder species, and *Acacia mearnsii*, *Alnus nepalensis*, *Albizia chinensis*, *A. falcata*, *Eucalyptus globulus* and *E. grandis* and *Sailx alba* var. *coerulea* among the fuelwood species, have given encouraging results. *Calliandra calothyrsus*, *Lespedeza bicolor*, and exotic pines, such as *Pinus greggii* and *P. elliotii* are the other promising species reported in this paper.

178 Gupta, R. K. 1989. **Development problems and potential for increased fodder production in the sub-Montane regions of Western Himalaya.** In Singh, T. V.; Kaur, J. (eds.) *Studies in Himalayan ecology and development strategies.* New Delhi: Himalayan Books. 145-157p.

Keyword(s): *Feed grasses / Pasture management / Himalayas*

Call No: 574.5264 SIS

Lang: En

The problems dealing with the development and management of sub-montane grasslands comprising the region of Siwaliks and the outer hill ranges of western Himalayas is presented. Development and management practises for increased production to improve the economy of the hill region is discussed. But the paper excludes the temperate and alpine regions of the montane and altimontane regions comprising principally of the high level oak and conifer forests and the alpine grasslands. Ecology of grass cover in the western Himalayas is also briefly described. List of grasses and their distribution is given in the Annex II.

179 *Indian Society of Tree Scientists.* 1987. **Social forestry for fodder production: Fourth Seth Memorial Lecture.** ISTS Newsletter 3(4):10-14 Solan: Indian Society of Tree Scientists.

Keyword(s): *Community forestry / Feed crops / Forest products*

Call No: 634.9 ISN

Lang: En

India is principally an agricultural country with a large livestock population. The livestock constitute an important component of the economy in the villages. The importance of the livestock in the economics of farming systems can be recognised but the desirability of maintaining a big livestock population is however debatable. Low productivity of livestock is mainly due to poor nourishment. The fodder product

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in the country is not sufficient to meet the requirement of livestock population. The possibility of increasing fodder production from agricultural land is not possible. Therefore, social forestry on wasteland, might help fodder produce. This article focusses on the prospects of social forestry for the production of fodder based on the strategy for meeting fodder shortage in terms of livestock population in India.

180 Pokhriyal, T. C.; Kumar, A.; Nautiyal, S. 1992. **Fodder from forests.** Dehra Dun: Indian Council of Forestry Research and Education. 426p.

Keyword(s): Forests / Herbs / Grasses / Fodder plants / Trees / Shrubs / India

Call No: 633.2 POF

Lang: En

The increasing shortage of fodder for the livestock calls for increased production, better utilisation, and effective management. The possibility of increasing fodder from agricultural land is limited, keeping in view the increasing human population and consequent rising demand for food from dwarf varieties. Wasteland reclamation with shrubs, herbs and grasses can enhance fodder production appreciably. The leaf fodder from some of the trees, shrubs, herbs is almost as nutritious as the agricultural green fodder crops. Therefore, the potential of fodder production from forest has to be systematically tapped. Forests support livestock population by providing green dry fodder and grazing facilities. This book provides consolidating information on fodder from forest. In the first half of the book, information on livestock population and requirement of fodder, forest grazing and policy, fodder resources and strategies for fodder production are included. While, in the second portion descriptive information of fodder plants have been given.

181 Pratap, D.; Qureshi, M. H. 1992. **Forest, fodder and hill agriculture: an analysis of inter-dependence in Uttar Pradesh Himalayan region.** The Indian forester 118(12):929-939

Keyword(s): Sustainable development / Forests / Agricultural research / Himalayas / India, UP

Call No: 634.9 INF

Lang: En

Forests as a source of fodder, fuel and timber, not only affect the economic activity of the people in the hill region, but play a dominant role in shaping their social and cultural life. The livestock which is so essential for the hill agriculture cannot be maintained without the fodder from forests. The quantity of the fodder brought from the forest depends on the size of the stock, the nature of feeding and the quantity of the fodder available from agriculture. Forests thus, serve as source of fodder, in varying degrees in the

Himalayan region. This paper highlights the analysed pattern of requirement of fodder so essential to maintain the livestock for agricultural purposes in the hill region and the role of forests in this process. It is observed that the dependence on forest for fodder requirement increases with increase in the altitude.

182 Purohit, K.; Samant, S. S. 1995. **Fodder trees and shrubs of central Himalaya.** Nainital: Gyanodaya Prakashan. 116p.

Keyword(s): Trees / Fodder plants / Leaves / Plants / Forests / Shrubs / India

Call No: 636.0855 PUF

Lang: En

In this book, about 150 trees and shrubs growing between 1,000 to 13,500m above sea-level in the central Himalayas have been described. Species have been arranged alphabetically. For each species correct botanical name, synonym if any, local name, family, distribution, botanical description, and uses have been given. Photorate and seed germination rate available in some cases is presented. Feed values, multi-purpose nature, propagation technique of some of them have been indicated on the basis of available literature. Leaf fodder is a major constitute of fodder base in the central Himalayas. Identification of many trees and shrubs used to obtain leaf fodder, observations on local methods and periods to feed them by herdsman have also been given. The most interesting features of the book includes, multiple utility, annual characteristics, lopping period of leaves, indicative methods to propagate, chemical composition, nutritive constituents, digestibility coefficients, total digestible nutrients of some trees and shrubs of the central Himalayas.

183 Raghavan, G. V. 1990. **Availability and use of shrubs and tree fodders in India.** In Devendra, C. (ed.) Shrubs and tree fodders for farm animals: proceedings of a Workshop held on 24-29 Jul 1989 at Denpasar, Indonesia. Ottawa, Ont: International Development Research Centre. 196-210p.

Keyword(s): Feed crops / Animal feeding / India

Call No: 636.085 DES

Lang: En

Ruminants feed widely on shrubs and tree leaves than on grass or grass legume pastures in India. Some fodder trees are almost as nutritive as leguminous fodders. This paper gives data enumerating the value of shrubs and tree leaves on nutritional aspects and their patterns of use by animal species. The data suggest the necessity for integrated, intensive efforts to cultivate and propagate shrubs and tree leaves. The critical limitations and constraints to use the fodder plants require, however, more intensive

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research for economic feeding, as is discussed in this paper. Government policies concerning the production of these feeds require an integrated approach involving concerned scientists and government departments.

184 Singh, P. 1990. Agrosilvipasture systems in India. In Devendra, C. (ed.) *Shrubs and tree fodders for farm animals: proceedings of a Workshop held on 24-29 Jul 1989 at Denpasar, Indonesia.* Ottawa, Ont: International Development Research Centre. 183-195p.

Keyword(s): *Agroforestry / Pasture management / Farming systems / India*

Call No: 636.085 DES

Lang: En

Agrosilvipasture systems have evolved in response to pressure of both animal and human population coupled with changing climatic regimes. The systems, integrating trees or woody perennials and grasses with crop farming, ensure stability in land productivity, achieve high productivity and diverse product, improve soil fertility, and enhance the supply of nutritious fodder to livestock in varied agroecological conditions. Agrosilvipasture systems, when compared with traditional land-use systems, have much higher yields and year-round forage availability. Potential fodder trees, grass species, and production systems, besides being economical, results in ecological improvement and show great promise for enhancing biomass production and meeting the increasing demand for forage and fuel wood. Each of these aspects, including the use of trees and shrubs, and research and extension needs are discussed in this paper.

185 Singh, P. 1990. Agrosilvipasture systems in India. In Devendra, C. (ed.) *Shrubs and tree fodders for farm animals: proceedings of a Workshop held on 24-29 Jul 1989 at Denpasar, Indonesia.* Ottawa, Ont: International Development Research Centre. 183-195p.

Keyword(s): *Pasture management / Cropping systems / India*

Call No: 636.085 DES

Lang: En

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when compared with traditional land-use systems, have much higher yields and year-round forage availability. Potential fodder trees, grass species, and production systems, besides being economical, results in ecological improvement and show great promise for enhancing biomass production and meeting the increasing demand for forage and fuelwood. Each of these aspects, including the use of trees and shrubs and research and extension needs are discussed in this paper.

186 Singh, P. 1989. Wasterlands their problems and potentials for fuel and fodder production in India. In Mellink, W. H. H.; Shingi, P. M. (eds.) *Wasteland development for fuelwood and other rural needs: report of the Regional Workshop on Development of Wastelands for Fuelwood Energy and Other Rural Needs held on 1-8 Nov 1988 at Vadodara, India.* Bangkok: FAO / Bangkok: Regional Wood Energy Development Programme in Asia. 102-113p.

Keyword(s): *Wasteland / Fuels / Feed crops / Land development / India*

Call No: 333.73 MEW

Lang: En

Wastelands present a picture of barren landscape where no agricultural activity thrives and no gainful employment is available. The increasing misuse of land resources through short-sighted development policies has resulted in wastelands with poor ecological and economic functions. Such lands are poor in fertility and their current use is only for grazing animals and mining of shrub roots or tree stumps for firewood. Considering the poor productivity, nature of risk, employment potential, demand for outputs and overall economic gains, tree-pasture farming seems to be most appropriate for wasteland development and utilisation. In this paper, several issues related to the problem of wastelands and their potentials for fuel and fodder production in India are presented.

187 Singh, R. V. 1982. Fodder trees of India. New Delhi: Oxford and IBH Pub. 663p.

Keyword(s): *Feed crops / Trees / Fodder plants / India*

Call No: 633.2 SIF

Lang: En

India is predominantly an agricultural country and has the largest cattle population in the world. A large livestock population, particularly in hill areas, cannot be maintained on the fodder production on arable land alone. Because of the increasing pressure of human population and also because of higher income from cereal and cash crops than from forage crops, more agricultural area cannot be set apart for fodder production. The potential of tree for green

fodder production is not fully appreciated in India except in the hill areas where they constitute a major source of green fodder for the livestock. The preference for leaf fodder among different tree species also differ with the regions. Some trees which are extensively lopped for leaf fodder in one region, are not either lopped at all or their leaf fodder is considered to be of poor quality in another region. The poor appreciation of tree leaf fodder is because of the fact that nutritional value of most of them has not been demonstrated. This book compiles the available information on the silviculture of Indian fodder-yielding trees of India. On the basis of available information on the nutritional value of leaf fodder of various tree species, this book has been divided into three parts. In the first part, tree species having nutritional value of leaf fodder has been determined. In the second part, tree species which are considered of regional importance for fodder production, but the nutritional value of whose leaf fodder has not yet been determined are included. In the third part, tree species which grow scattered and are lopped locally for leaf fodder whose chemical composition and nutritional value are yet to be determined are included. For each tree species their habitat, life history, silvicultural characters, natural reproduction and artificial propagation and its importance as leaf fodder is presented.

188 Singh, V.; Naik, D. G. 1987. **Fodder resources of central Himalaya.** In Pangtey, V. P. S.; Joshi, S. C. (eds.) Western Himalaya: environment problems & development. Nainital: Gyanodaya Prakashan. 223-241p.

Keyword(s): Vegetation / Animal production / Feed crops / Himalayas

Call No: 551.431 PAW

Lang: En

As in many hill regions of Asia, livestock form an essential and integrated part of mixed farming systems. To many families, especially those having no cultivated land, livestock are the only source of livelihood. Therefore, the fodder resource has become the important source in the hill regions of Asia. This paper presents the survey report on the fodder resources of central Himalayas along with its methodology. A detailed inventory on the source and existing availability of dry and green fodder, requirements and deficit and surplus of fodder and grazing pressure on grasslands have been discussed. Finally, an attempt has also been made to give a programme of efficient management of communal land for harnessing maximum fodder production potential.

189 Yadav, H. R. 1989. **Agroforestry and animal husbandry development on the**

wastelands of Sultanpur district. In Singh, P. (ed.) Problem of wasteland and forest ecology in India. New Delhi: Ashish Publishing House. 115-123p.

Keyword(s): Agroforestry / Animal husbandry / Waste land

Call No: 333.3 SIP

Lang: En

The problems of wastelands and animal in the Sultanpur district is analysed in this paper. This is followed by the discussion on the problem of animals and agroforestry systems for animal husbandry and wastelands development in Sultanpur district. Finally, conservation measures are briefly discussed.

Nepal

190 Iles, A.; Dool, V. D. 1986. **United Mission to Nepal (UMN)'s work on fodder trees.** In Robinson, P. J. Proceedings of the first Meeting of the Working Group on Fodder Trees, Forest Fodder and Leaf Litter held on 23 Jun 1986 at Kathmandu, Nepal. (FRIC occasional paper, 3/87). Kathmandu: Nepal. Department of Forest. Forest Research and Information Centre. 10-10p.

Keyword(s): Rural development / Institutional framework / Feed crops / Fodder plants / Nepal

Call No: 636.08551 ROP P

Lang: En

This article provides the summary of the work conducted by United Mission to Nepal on fodder improvement by planting fodder trees through Community Development and Health Project in Jumla, Surkhet, Andhi Khola, Okhaldunga, and Lalitpur Districts.

191 Joshi, N. P.; Singh, S. B. 1990. **Availability and use of shrubs and tree fodders in Nepal.** In Devendra, C. (ed.) Shrubs and tree fodders for farm animals: proceedings of a Workshop held on 24-29 Jul 1989 at Denpasar, Indonesia. Ottawa, Ont: International Development Research Centre. 211-220p.

Keyword(s): Feed crops / Animal feeding / Nepal

Call No: 636.085 DES

Lang: En

Fodder from more than 100 different kinds of trees and shrubs are used as animal feed in Nepal. More than 75 per cent of the trees and shrubs are used from November to June. Fodder production depends on species, locality, age, season, and method of lopping. Most of the fodder trees and shrubs in Nepal supply firewood, timber, fruits, vegetables,

fibre and fat for soap, and are used for agricultural tools, in medicine, and as live hedges. Fodder trees and shrubs are usually lopped once a year and fed fresh to the animals. This paper provides information on the geographical distribution of fodder plants, patterns of use of fodder trees and shrubs, their nutritive value, fodder yield, other uses of fodder trees and shrubs, toxic effects of fodder trees, and recommendations to improve and enhance the use of shrubs and tree fodder in Nepal.

192 Kark, J. B. S. 1992. **Forest and fodder: an historical perspective.** Banko janakari: a journal of forestry information for Nepal 3(3):1-4

Keyword(s): Fodder plants / Forest products

Call No: 634.9 BAJ

Lang: En

The forest is a source of many products used by hill farmers for a variety of purpose. Fuelwood and fodder are the most important products extracted from the forest. It seems unlikely that fuelwood-gathering alone has contributed significantly to the loss of forest areas over the last two centuries. This paper highlights the ecological consequences of fodder consumption and other landuse systems in the middle hills of Nepal. Some attention has been given to the socioeconomic consequences as well. Different control remedies and its effort to control forest use has also been discussed.

193 Nield, R. S. 1985. **Fuelwood and fodder: problems and policy.** In Nepal. Ministry of Water Resources. Water and Energy Commission. Five Energy Workshops: Small Hydro, Micro Hydro, Biogas, Improved Cookstoves, Fuelwood and Fodder: proceedings of the workshops on ... held on Sep-Nov 1986 at Kathmandu, Nepal. Kathmandu: Nepal. Ministry of Water Resources. Water and Energy Commission. (33)p.

Keyword(s): Energy / Forestry / Land use / Fuelwood / Feed crops

Call No: 333.79 WAF

Lang: En

Problems and policy required for the development of fuelwood and fodder are presented in this paper. In this context, the author has first discussed the consumption and supply from the land resource base and then described the current land used situation in Nepal. Potentiality of productive forest and pasture land is discussed followed by forest management policy required for its development. Finally, the problems and constraints are discussed with its solution and the means of carrying them out.

Pakistan

194 M. Akram; S. H. Haujra; M. A. Qazi. 1990. **Availability and use of shrubs and tree fodders in Pakistan.** In Devendra, C. (ed.) Shrubs and tree fodders for farm animals: proceedings of a Workshop on ... held on 24-29 Jul 1989 at Denpasar, Indonesia. Ottawa, Ont: International Development Research Centre. 176-182p.

Keyword(s): Feed crops / Animal feeding / Pakistani

Call No: 636.085 DES

Lang: En

Despite efforts to increase fodder production in Pakistan, livestock farmers experience traditional periods of shortage in May-June and October-November. Shrubs and trees are potentially important and merit attention, especially in areas where conventional agriculture may not be possible or desirable because of dangers of site degradation; steep and rocky slopes; arid, saline, or water-logged soils; or severe climatic conditions. This paper presents a brief information on the value of shrubs and tree fodder, national forage and fodder research programme, availability and use of shrubs and tree fodder and recommendations for its improvement. According to the paper, some promising exotic and indigenous fodder trees and shrubs have been selected for plantation in various ecological zones of Pakistan.

Asia

195 Copland, J. W.; Djajanegara, A.; Sabrani, M. 1994. **Agroforestry and animal production for human welfare: proceedings of an International Symposium held in association with the 7th AAAP Animal Science Congress on 11-16 Jul 1994 in Bali, Indonesia.** (ACIAR [Australian Centre for International Agricultural Research] proceedings, 55). Canberra, ACT: Australian Centre for International Agricultural Research. 125p.

Keyword(s): Agroforestry / Animal production / Livestock management / Pasture management / Asia / Asia and the Pacific

Call No: 634.9 COA

Lang: En

This series of publication includes the papers of research workshops of an international symposium on 'Agroforestry and animal production for human welfare' held in Indonesia, from 11-16 July 1994. This publication includes seventeen research papers

Tree Fodder, Agroforestry and Fodder Development

presented at the symposium mainly dealing with different subjects to explore the evidence, experiences and information which provide alternatives in developing agroforestry and animal production systems that will contribute to improve human welfare by producing appropriate technology and policy.

196 Gintings, A. N.; Lai, C. K. 1994. **Agroforestry in Asia and the Pacific: with special reference to silvopasture systems.** In Copland, J. W.; Dijajanegra, A.; Sabrani, M. (eds.) *Agroforestry and animal production for human welfare: proceedings of an International Symposium held in association with the 7th AAAP Animal Science Congress on 11-16 Jul 1994 in Bali, Indonesia.* (ACIAR [Australian Centre for International Agricultural Research] proceedings, 55). Canberra, ACT: Australian Centre for International Agricultural Research. 32-38p.

Keyword(s): *Agroforestry / Silvopastoral systems / Pasture management / Asia and the Pacific*

Call No: 634.9 COA

Lang: En

Agroforestry as a farming system has been practised in the Asia-Pacific region for many centuries. Agroforestry practices and systems are diverse and vary within and between countries. Population growth is increasing the need for more agricultural land; at the same time the land available for agriculture is dwindling. Consequently, the pressure on forest and land resources is becoming serious. The development of an appropriate agroforestry system in all agroecological zones is necessary. This paper focuses on agroforestry systems especially with examples of silvopasture systems in several countries (Bangladesh, India, Nepal, Pakistan, Sri Lanka, Indonesia, Lao PDR, Philippines, Thailand, Vietnam, China, Papua New Guinea) in the Asia-Pacific regions, and discusses the future directions for agroforestry and silvopasture research and development. Silvopasture is one form of agroforestry that produces grass and fodder for livestock.

197 M. Wanapat. 1990. **Availability and use of shrubs and tree fodders in Thailand.** In Devendra, C. (ed.) *Shrubs and tree fodders for farm animals: proceedings of a Workshop held on 24-29 Jul 1989 at Denpasar, Indonesia.* Ottawa, Ont: International Development Research Centre. 244-254p.

Keyword(s): *Feed crops / Animal feeding / Thailand*

Call No: 636.085 DES

Lang: En

Feed resources for livestock production in Thailand are becoming increasingly important because of the rising costs and scarce supplies. It is, therefore, imperative to use fully the available feed resources, including unconventional supplies, to meet the rising demands of the rapidly increasing animal populations, especially during critical feed shortages. Crop residues, shrubs, and tree fodders are potentially important in small farms to alleviate shortage of feed and increase the efficiency of the production system. However, some of these feeds contain toxic elements that need to be reduced or removed before they can be fed to animals. Evaluation of essential agronomic characteristics and nutritive value of potentially important shrubs and tree fodders and use of these plants have been summarised in this paper with important recommendations for its development.

198 Singh, P. 1994. **Agroforestry as a feed base for livestock in semi-arid regions of Asia.** In Copland, J. W.; Dijajanegra, A.; Sabrani, M. (eds.) *Agroforestry and animal production for human welfare: proceedings of an International Symposium held in association with the 7th AAAP Animal Science Congress on 11-16 Jul 1994 in Bali, Indonesia.* (ACIAR [Australian Centre for International Agricultural Research] proceedings, 55). Canberra, ACT: Australian Centre for International Agricultural Research. 99-105p.

Keyword(s): *Livestock management / Agroforestry / Feed crops / Semiarid zones / Asia*

Call No: 634.9 COA

Lang: En

Livestock, especially the large and small ruminants, are a valuable resources in the semi-arid Asian region. But their productivity is quite low in most situations. Lack of adequate amounts of quality feed is one of the principal reasons for this. Incorporation of a leguminous component has potential to improve the quality of existing grasslands. Among such legumes, trees and shrubs assume special importance because of their ability to provide fodder during lean periods, the multiple uses to which they can be put, their establishment and maintenance, and the possibility of growing them as a component in two and three-tier systems. Potential species may be incorporated in the farm through various agroforestry options: live fences, alley cropping, plantation on uncropped areas and agrosilvopasture and silvopastures. In the present paper, an effort has been made to explore and identify some promising shrubs and tree legumes for different agroforestry systems and grasslands in the region. It also presents an account of management aspects for obtaining regular yields and their effects on livestock productivity.

199 Topark-Ngarm, A. 1990. **Shrubs and tree fodders in farming systems in Asia.** In Devendra, C. (ed.) *Shrubs and tree fodders for farm animals: proceedings of a Workshop held on 24-29 Jul 1989 at Denpasar, Indonesia.* Ottawa, Ont: International Development Research Centre. 12-21p.

Keyword(s): *Feed crops / Trees / Farming systems / Asia*

Call No: 636.085 DES

Lang: En

Farming systems in Asia normally include small-scale crops and livestock. The performance and productivity of the farm animals are generally poor

because of the limited farm area and animal feeds, especially during the dry season. Shrubs and fodder trees are one solution to the feed problem. In general, the shrubs or trees can be incorporated economically into the farm as living fence around the household, vegetation on the farm's uncropped areas, hedgerows in alley cropping, or as a component species of intercropping. However, shrubs and fodder trees are relatively underused. In this paper, the establishment techniques and benefit of useful shrubs and trees are discussed. More information on species adaptation, nutritive value and crop management are needed to use shrub and tree fodder more efficiently in farming systems, which is suggested in this paper.

Livestock Production, Management and Development

General

200 Amir, P.; Knipscheer, H. C. 1989. **Conducting on-farm animal research: procedures and economic analysis.** Morrilton, AR: Winrock International Inst. for Agricultural Development / Ottawa, Ont: International Development Research Centre. 244p.

Keyword(s): *Animal production / Farming systems*

Call No: 636.072 AMC

Lang: En

There is an increased awareness of the important role of livestock in Asian economics. Different livestock species are used to cultivate land, transport goods and people in rural areas, provide manure for fuel and crop production, utilise marginal lands and crop residues, and provide a form of insurance for farm households. It is this livestock which makes many important contributions to the welfare of the people. Therefore, more research needs to be done on livestock. Farming Systems Research (FSR) is an approach towards on-farm animal research (OFAR) which makes modern production techniques applicable to the complex but poorly endowed mixed farms that are predominant in the developing world. This book presents elementary tools used by animal scientists to conduct on-farm livestock analysis and also provides methods to carry out or participate in animal research. The materials in the book have been arranged in 10 chapters. Each chapter begins with a statement of purpose and list of objectives and ends with a summary of the chapter material. Chapter One describes FSR as one approach to OFAR. Chapter Two outlines some important animal-production concepts for nonscientists. Chapter Three covers the economic concepts that are essential for technology evaluation and analysis. Chapter Five presents a model for screening animal technologies at the research station before on-farm testing is conducted. General guidelines for conducting on-farm research while identifying some common shortcuts and pitfalls are provided in Chapter Six. The tools needed to carry out simple economic analysis is presented in Chapter Seven. Chapter Eight covers basic marketing concepts that are relevant to on-farm research. The risk and uncertainty inherently related to a new technology is focused in Chapter Nine and Chapter Ten covers topics such as obtaining support for on-farm research, the roles of different levels of management in supporting research, and the incentives needed to promote on-farm animal development. It also identifies sources of further information.

201 Bayer, W. 1990. **Animals that make little demand.** International agricultural development 10(3): 12-13

Keyword(s): *Animal breeding / Animal husbandry / Animal products*

Call No: 630.5 INA

Lang: En

Within the various systems of livestock-keeping practised by smallholders in the third world, the function of animals are complex, but fulfils different functions by different species. Indigenous breeds of livestock are often the most suitable and appropriate but are usually under-estimated by scientific breeders. This article presents brief information on the breeding, performance and research carried out regarding different species of livestock in different countries of the world.

202 Bayer, W.; Waters-Bayer, A. 1989. **Crop-livestock interactions for sustainable agriculture.** London: International Inst. for Environment and Development. 16p.

Keyword(s): *Agricultural production / Livestock*

Call No: 633 BAC P

Lang: En

Crop-livestock interactions are essential for intensive use of local resources and for the social, economic, and ecological sustainability of small holder farming systems. It is, therefore, important that their functions be appreciated in the planning and implementation of agricultural development. This paper focuses on the crop-livestock interactions for sustainable development in agriculture by increasing subsistence security and by practising both crop and livestock production. Crop-livestock interactions are discussed as a key to ecological sustainability by intensifying nutrient and energy cycles. This paper thus, reviews the crop-livestock interactions for sustainable agriculture as contemporary importance and draws preliminary conclusions of relevance to development activities by providing various recommendations for its future development.

203 Bayer, W.; Waters-Bayer, A. 1992. **Livestock sustaining livelihoods.** ILEIA [Informationcentre for Low External-Input and Sustainable Agriculture] newsletter 8(3):4-5

Keyword(s): *Livestock management / Animal production / Sustainable development*

Call No: 631.8 ILN

Lang: En

In almost two-thirds of the world, domestic animals compete very little with humans for food or for land to grow it. Instead, they complement cropping when non-arable land is used to produce their food. Animals are also an insurance against low yields and crop failure, when they can be eaten or sold to buy food. Livestock are particularly important for human use of the drylands. Importance and role of livestock in sustaining livelihoods of a far larger number of

people than many modern, specialised systems could, is discussed in this paper.

204 Bernsten, R. H. 1982. **Analytical approaches to farming systems research with an emphasis on animal production.** In Time, J. E.; Lattimore, R. G. (eds.) *Livestock in Asia: Issues and policies.* Ottawa, Ont: International Development Research Centre. 180-185p.

Keyword(s): *Livestock / Farming systems / Animal production*

Call No: 636 FIL

Lang: En

Farming systems approaches have become increasingly popular strategies for structuring agricultural research programmes. Yet, most programmes focus on the crop component and overlook the livestock and mixed livestock/crop systems. Although there are several possible reasons for the emphasis, it seems that much of the methodology developed for crop analysis can be modified for livestock analysis. This paper reviews the major characteristics of farming systems research, constraints regarding livestock systems research and attempt has been made to draw upon the cropping systems experience to suggest how this methodology could be extended and utilised by livestock scientists. Several recommendations are made regarding the implementation of livestock systems research.

205 Bijman, J. 1992. **Can biotechnology help to livestock productivity?** *Biotechnology and development monitor* (11):3-5

Keyword(s): *Biotechnology / Livestock management / Animal production*

Call No: 620.805 BID

Lang: En

One of the greatest challenges for livestock production in developing countries is to meet the growing demand for animal products. Population growth and shortages of foreign exchange require an increase in domestic livestock production. Moreover, a rise in per capita income particularly in certain Asian countries, leads to a shift in diet towards more animal products. This article focuses on applications of biotechnology in reproduction and breeding, and in livestock feeding. The latest development in animal biotechnology are discussed, while examples are taken from experiences in the developing countries.

206 Devendra, C.; Burns, M. 1983. **Goat production in the tropics.** Slough: Common Wealth Agricultural Bureaux. 183p.

Keyword(s): *Goats / Animal husbandry / Animal production*

Call No: 636.39 DEG

Lang: En

Although goats have served man from birth of history and are numerous in the widely scattered areas of the tropics, they have received limited scientific attention. In comparison with other domestic animals, goats are often victims of prejudice and neglect, but they have, nevertheless, fulfilled a most useful task in supplying a part of the human population with milk, meat, hair, leather and other products. Nearly all aspects of goat production are splendidly reviewed, much of it is summarised and particular attention and emphasis have been given to two considerations important for promoting goat production. Firstly, clearer understanding of the extent of the usefulness of goats are given and, secondly, attention is focussed on the real possibilities of increasing their productivity through greater exploitation. This book is indeed a source book of very valuable information on individual characteristics of a bewildering variety of breeds and types of goats, on the comparative performance of introduced breeds and also on pertinent aspects of their management. In addition, interesting comparisons are made with buffaloes and cattle, which demonstrate the ability of the goat to compete successfully with these animals.

207 Durning, A. B.; Brough, H. B. 1991. **Taking stock: animal farming and the environment.** (Worldwatch paper, 103). Washington, DC: Worldwatch Inst. 62p.

Keyword(s): *Livestock management / Animal husbandry / Environmental impact*

Call No: 636 DUT

Lang: En

Traditionally, farm animals have played an indispensable role in keeping agriculture on a sound ecological footing by returning nutrient to soil in different forms. This book discusses the prominent role of animal farming to the environment and the importance of livestock in economy, ecology, as food for human being. The constraints in each field are also discussed. Finally, the future prospects of livestock and its importance in solving the environmental problems are discussed.

208 Fagard, P. 1980. **Guideline for dairy accounting.** (FAO Animal Production and Health paper, 21). Rome: FAO. 37p.

Keyword(s): *Accounting / Manuals / Dairy industry*

Call No: 658.863 FAG P

Lang: En

This publication provides a basis for the establishment of a quantity control system for the dairy industry. The main aim of quantity control is to improve the efficiency of all sections of the dairy organisation or at least to maintain it at a high level.

Chapter One of this publication gives a description of the quantity control systems in the various sections of the dairy industry. The documents to be used with this system are presented in Chapter Two.

209 FAO. 1979. **Buffalo reproduction and artificial insemination: proceedings of the seminar on Reproduction and Artificial Insemination of Buffaloes held on 4-15 Dec 1978 at Karnal, India.** (FAO Animal production and health paper, 13). Rome: FAO. 363p.

Keyword(s): *Animal breeding / Artificial insemination / Livestock / Buffaloes*

Call No: 636.293 FOB

Lang: En

Over a considerable number of years, FAO has emphasised the actual and potential value of the water buffalo and has endeavoured to stimulate interest in this neglected domestic animal while focussing attention on the need for investigation, detailed trails, observations and research in many disciplines in order to close the gaps in knowledge. The proceedings includes the text of the working papers presented at the seminar, which mainly focus on the reproduction and artificial insemination of buffaloes.

210 FAO. 1993. **Global outlook on milk and milk products.** Asian livestock 18(2):16-19 Rome: FAO.

Keyword(s): *Dairy products / Milk production / Milk products*

Call No: 636 ASL

Lang: En

This article discusses the production, consumption and trade of milk from cows and other livestock from a global point of view.

211 Ford, J. R. D.; Munoz, H. 1990. **Lessons learned.** Ceres: the FAO review 22((1)125):36-40

Keyword(s): *Manuals / Animal husbandry / Dairy industry*

Call No: 630.05 CEF

Lang: En

Different types of milk production system carried in different years are discussed, in this paper along with its management, production, and transportation system. Finally, the policy regarding the prices for import and the lesson learned during the milk production system is also discussed.

212 Geering, W. A. 1984. **Emergency disease of livestock.** Rome: FAO. 2v(251 + 104)p.

Keyword(s): *Animal diseases / Livestock*

Call No: 636.089616 GEE

Lang: En

This publication consists of two volumes. In the first volume, the author has covered the disease found in the livestock and their diagnosis. The book aims to assist veterinary administration and field staff in the recognition and diagnosis of the more important emergency disease of animals. It describes the silent features of each disease, and describes how to recur a diagnosis. The laboratory tests that are employed are briefly described, but not in a form to make it a laboratory diagnostic manual. The tests are only described in sufficient detail to give field officers an appreciation of how to collect the best specimens and what they should expect of the laboratory. Second volume deals with the equally important subject of preplanning for a disease emergency and management of a major disease control programme.

213 Gryseels, G.; Anderson, F. M. 1983. **Research on farm and livestock productivity in the central Ethiopian highlands: initials results 1977-1980.** Addis Ababa: International Livestock Centre for Africa. 52p.

Keyword(s): *Livestock management / Animal production / Agricultural research / Ethiopia*

Call No: 636 GRR

Lang: En

In this paper, the Ethiopian highlands are briefly described and their potential for improved agricultural production is assessed. ILCA's (International Livestock Centre for Africa) studies on the traditional smallholder production system of the highlands are then reported in detail, and productivity aspects of the system's crop and livestock components are analysed. The results of research on innovations, including an improved forage/dairy cow package, improved animal traction and the cultivation of bottomland, are given. The approach to Farming System Research (FSR) with special reference to livestock is discussed together with the implications for adoption of the approach and its results by a national agency, some research experiences, and the outlook for future research.

214 Haffmann, D.; Nari, J.; Petheram, R. J. (eds.) 1989 **Draught animals in rural development: proceedings of an International Research Symposium held on 3-7 Jul 1989 at Cipanas, Indonesia.** (ACIAR [Australian Centre for International Agricultural Research] proceedings, 27). Canberra, ACT: Australian Centre for International Agricultural Research. 347p.

Keyword(s): *Draught animals / Animal power / Rural development / Livestock management*

Call No: 307.72 HOD

Lang: En

Collaborative international research implies endeavours, not only in the sphere of science, but in communication and crosscultural exchange. This is particularly valid in the case of draught animal production, where the wide variation in the history and utilisation of animals for power across the world gives rise to a valuable range of knowledge, skills and resources that could be brought to bear on this important field of livestock research. The proceedings include papers, which reflect something of the balance of disciplines involved in draught animal power (DAP) research, perhaps with some notable omissions, such as that of crop and soil scientists. The volume includes papers presented at the symposium, which is placed in eight different sections. Introductory papers have been included in the first section. Regional emphasis and progress in DAP research and farming systems research relating to DAP is included in the second and third section. Papers on nutrition and physiology, reproduction, breeding and selection, and health, training and management of draught animal production have been included in fourth, fifth, and sixth sections. Engineering aspects of DAP is included in the seventh section and economics of draught animal power is in section eight. In addition, recommendations presented at the workshop have also been presented for future research on different topics.

215 Hart, R. D. 1987. **Research and development strategies to improve integrated crop, livestock and tree systems.** In Consultative Group on International Agricultural Research. International Agricultural Research Centres. Proceedings of the workshop of Farming Systems Research held on 17-21 Feb 1986 at Patancheru, India. Paris: Consultative Group on International Agricultural Research. International Agricultural Research Centres. Andhra Pradesh: International Crop Research Institute for the Semi-Arid Tropics. 92-95p.

Keyword(s): *Feed crops / Livestock / Fodder plants*

Call No: 631.072 COP

Lang: En

The goal of agricultural research and development is to produce large-scale development changes. This can be achieved by identifying small changes that can be made at critical points, to trigger a series of changes that will lead to a desired developmental goal. It is difficult to identify these small-scale technological changes without an understanding of the systems that link the target research phenomenon with the target development phenomena. The central

theme of this paper is that the characteristics of the agricultural systems that are targeted for agricultural research and development should determine the selection of an appropriate research and development strategy. On this basis, five types of research and development strategies are discussed and summarised graphically in this paper. Of the five research and development strategies discussed in this paper, the optional-system-emphasis strategy is determined as probably the most appropriate research and development strategy for national institutions.

216 Hatcher, G. 1984. **A planning guide for small scale livestock projects.** Arkansas, AR: Heifer Project International. 80p.

Keyword(s): *Livestock management / Project design*

Call No: 636.06 HAP

Lang: En

This book presents a planning guide for small-scale livestock projects. The book is based upon years of field experiences of the authors in animal agriculture, community, development, and extension programme with the rural poor. It does not present new information, but rather attempts to gather useful materials in one place, to make it easily accessible. The topics dealt in this book are: the care for animal agriculture; preliminary consideration in planning a project; genetic improved in livestock; looking at various species; project monitoring; farmer education; and what is a Heifer Project.

217 Indian Council of Agricultural Research. 1985. **Nutrient requirements of livestock and poultry.** New Delhi: Indian Council of Agricultural Research. 13p.

Keyword(s): *Poultry / Animal nutrition / Livestock management*

Call No: 636.089123 INN P

Lang: En

India is very rich in livestock wealth in the form of almost all important species of domesticated animals. A large genetic diversity exists of breeds and strains which are well adapted to different agro-ecological conditions and economic functions. Unfortunately, their genetic potential has not been fully exploited mainly due to various physical, environmental, nutritional, and health constraints. This publication provides information arising from experimental work carried out in India over the past several years on nutrient requirements of livestock and poultry. The nutrient needs of livestock and poultry breeds developed under tropical environment are different from those developed in temperate climate, which have been described in this paper. An urgent need for evolving a feeding standard for

different livestock species is required, which is emphasised in this publication.

218 *International Development Research Centre*. 1988. **Crop and Animal Production Systems Program**. Ottawa, Ont: International Development Research Centre. 45p.

Keyword(s): *Developing countries / Agricultural research / Agricultural production / Crop yield / Animal husbandry*

Call No: 630.72 INC P **Lang:** En

This booklet is intended to familiarise researchers and research-funding agencies with the scope of research supported by the Agriculture, Food and Nutrition Sciences Division of the International Development Research Centre (IDRC). It also provides information on how IDRC works with scientists in identifying research priorities and on the kind of support provided to researchers for developing and executing projects in the field of crop and animal production research. The booklet describes the objectives, strategies and main research areas of the Crop and Animal Production Systems (CAPS) programme of the Agriculture, Food and Nutrition Sciences Division. It provides an overview of the philosophy and activities of the programme for those scientists, policymakers, and students throughout the world with whom CAPS interacts.

219 *International Inst. of Rural Reconstruction / Philippines. Dep. of Environment and Natural Resources*. 1992. **Livestock and poultry production**. In *International Inst. of Rural Reconstruction / Philippines. Dep. of Environment and Natural Resources. Agroforestry technology information kit (ATIK)*. International Inst. of Rural Reconstruction / Diliman: Philippines. Dep. of Environment and Natural Resources. v.4(105p)p. International Inst. of Rural Reconstruction / Diliman: Philippines. Dep. of Environment and Natural Resources.

Keyword(s): *Poultry farming / Livestock management / Meat production*

Call No: 634.999 INA **Lang:** En

Agroforestry, the land management system of incorporating crop production with tree and livestock production, evolved to become one of the most widely promoted tools for sustaining development in the uplands. This book is an updated kit with full illustration on livestock and poultry production using indigenous technologies. The focussed topics are simple agro-livestock technology; intensive feed garden; characteristics of forage grasses; plant based

livestock medication; small-scale cattle production; forced-feeding technology; native pig production; improving the native chicken; family backyard poultry project; native bee production; and on-farm and off-farm fodder sources in agroforestry.

220 *Itty, P.* 1993. **Information systems for livestock programs in developing countries**. In Maru, A.; Itty, P.; de Groot, B. (eds.) *Information systems for livestock research and development in India: proceedings of a Workshop held on 1-3 Feb 1993 at Avikanagar, India. Ajmer: Indo-Swiss Goat Development and Fodder Production Project / Jaipur: Institute of Development Studies*. 21-30p.

Keyword(s): *Animal husbandry / Information systems / Developing countries / Livestock management*

Call No: 636.3 MAI **Lang:** En

Growing complexity in livestock development and research calls for information systems. This paper presents an overview of the main steps involved and the points to be defined. The data itself, their sources and the processing of information on animal health, nutrition, natural resources, animal production and socioeconomics are discussed. These categories of data cannot be considered in isolation as they are, in reality linked. Although an information system which focuses on one category can be adequate, the data collected should cover also other disciplines. The use of computers appears as appropriate to deal with the increasing complexity and volume of data, in recording, analysing, presenting and disseminating information. Descriptions are provided for LIMS (Livestock Information Management Systems), IBIEHM (ILCA Bio-Economic Herd Model) and the application of GIS (Geographic Information Systems).

221 *Kasali, U. B.; Njau, B. C.; Bekele, T.* 1988. **Controlling livestock diseases in the tropics by breeding: a perspective**. In Thomson, E. F.; Thomson, F. S. *Increasing small ruminant productivity in semiarid areas*. Dordrecht: Kluwer Academic Publishers. 237-242p.

Keyword(s): *Disease control / Animal diseases / Animal breeding*

Call No: 636.2 THI **Lang:** En

The production of small ruminants in the tropics is largely constrained by gastrointestinal parasites. These parasites are a potential cause of reduced production, which has very important economic implications. Although many species of parasites are involved, only a few are of major economic

importance due to their greater pathogenicity and relative abundance. A breeding programme to produce livestock with improved disease resistance could play a particularly important and valuable role in the control of livestock diseases because useful genes, once established in target populations, do not require sophisticated management or other disease control measures to continue functioning. This paper describes the ways of controlling livestock diseases in the tropics through the breeding programme. A brief information on trypanosomiasis and gastrointestinal parasites is also presented.

222 Krishnamurti, C. R.; Vera, A. J. 1988. **The significance of nutrient balance in diets for farm animals.** In Devendra, C. (ed.) *Non-conventional Feed Resources and Fibrous Agricultural Residues: Strategies for Expanded Utilization - proceedings of a consultation held on 21-29 Mar 1983 at Hisar, Ottawa, Ont: International Development Research Centre / New Delhi: Indian Council of Agricultural Research.* 33-49p.

Keyword(s): *Agricultural wastes / Feed crops / Animal nutrition*

Call No: 636.085 DEN

Lang: En

Although physical, chemical and microbiological methods have been studied to improve the nutritional quality of crop residues, the majority of studies are involved only *in-vitro* and *in-vivo* digestibility to test the efficacy of these procedures. Inadequate work has been done on nutrient balance and utilisation when crop residue are the major sources of nutrients. In several regions of Asia and Africa, fibrous crop residues (FCR) have been used as the major source of roughages for livestock. The paper reviews the current technology for improving the quality of roughages, since the bio-availability of nutrients is dependent upon nutrient balance and interactions. The methodology for the assessment of nutrient utilisation by animals consuming fibrous crop residues is discussed with particular reference to macro and micro minerals.

223 Nordblom, T. L.; Ahmed, A. K. H.; Potts, G. R. (ed.) 1985 **Research Methodology for Livestock On-farm Trials: proceedings held on 25-28 Mar 1985 at Syria.** Ottawa: International Development Research Centre. 313p.

Keyword(s): *Farm management / Agricultural research / Feed crops / Case studies / Livestock*

Call No: 636.0072 NOR

Lang: En

This document is intended to facilitate the sharing of ideas and experiences of scientists interested in livestock on-farm trials (LOFTs) in direct cooperation

with farmers and are working with national programmes in the Middle East, Africa, or elsewhere. It comprises twelve case studies on particular research and five methodological summaries. Although a number of the studies addressed livestock on-farm trials in the context of this definition, others implied much broader definitions: demonstration of a livestock technology, a complete package of component livestock research focused on a particular livestock system, and the extension approach in which a technology is transferred to as many beneficiaries as possible. In general, all twelve papers demonstrate the wide scope of research problems and livestock production systems that may be approached with LOFTs. Two papers deal with feeding trials in commercial cattle fattening lots. Two papers focus on new irrigated forage crops for cattle. Another two papers look at rainfed forage production and use. While three papers deal with innovations in livestock uses, management, and experimental control: crossbreed dairy cows for draft power in Ethiopia; dual-purpose goats in western Kenya; and in-herd/on-range trials with sentinel herds of cattle in Sudan. Finally, three papers report on the testing of new inputs to the farming system; alley farming with leguminous forage trees for goats feed in Nigeria; mineral supplementation of goats in western Java, Indonesia; and the ammoniation of straw for cattle in Egypt.

224 Nygaard, D. F.; Amir, P. 1988. **Research strategies for development: improving sheep and goat production in developing countries.** In Thomson, E. F.; Thomson, F. S. *Increasing small ruminant productivity in semiarid areas.* Dordrecht: Kluwer Academic Publishers. 37-50p.

Keyword(s): *Goats / Developing countries / Animal husbandry / Sheep*

Call No: 636.2 THI

Lang: En

The importance of animals to people and the role of small ruminants in farm families in developing countries is very important. The livestock can obtain their nourishment from grasses and other fibrous forage which people cannot directly utilise. In turn, they provide humans with an adequate supply and proper balance of energy, minerals, vitamins and essential amino acids which human metabolism cannot do without. Therefore, it is the premise of this paper that animals contribute to agricultural systems and farm family incomes in developing countries in unique, numerous and complicated ways which make it difficult for researchers to capture research funds. The paper focuses on the role of small ruminants in agricultural systems in the first part. The second part of the paper explicitly explores the new research and development agenda of developing countries and of

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the donor community in search of the linkages and opportunities that exist for collaborative research and development programmes.

225 Perdok, H. B.; Leng, R. A.; Bird, S. H. 1988. **Improving livestock production from straw-based diets.** In Thomson, E. F.; Thomson, F. S. Increasing small ruminant productivity in semiarid areas. Dordrecht: Kluwer Academic Publishers. 81-91p.

Keyword(s): *Straw / Animal nutrition / Animal production / Animal feeding*

Call No: 636.2 THI

Lang: En

Straw alone is a poor quality feed. But it cannot be regarded as a poor quality forage since with correct supplementation, moderate levels of production can be achieved. It is better therefore, to refer to straw as an unbalanced forage, as this has been emphasised in this paper as the primary constraint to production of animals consuming straw-based diets. This paper thus, discusses the improvement of livestock production by providing them with treated straw that is supplemented with a variety of specific nutrients. There are a number of manipulations that can be used to improve straw utilisation by ruminants which has also been described in this paper.

226 Shia, Y. 1994. **Applications of biotechnology to livestock production.** In Asian Productivity Organisation. Biotechnology applications in agriculture in Asia and the Pacific Report of an APO study meeting on 18-28 Jan 1994 at Tokyo, Japan. Tokyo: Asian Productivity Organisation. 40-59p.

Keyword(s): *Biotechnology / Livestock / Animal production / Technology transfer*

Call No: 630 ASB

Lang: En

There has been remarkable improvement in reproduction technologies to improve or to change animal production by germ cell engineering. The present paper discusses reproduction technology used for livestock especially for cattle, in relation to individual technical details, current technological advances, their advantages and disadvantages, and future prospects.

227 Shillhorn Van Veen, T. W. 1981. **Livestock systems and animal health.** In Axinn, G. H. Farming Systems Research Group: working papers. Michigan, MI: Michigan State University. Farming Systems Research Group. (9)p.

Keyword(s): *Livestock management / Animal health*

Call No: 631.072 AXF

Lang: En

The biological process involved in crop and livestock production are well known and do not, in their basic manifestations, appear to differ insignificantly in developed or developing countries. But basically they do not differ when comparing a subsistent production system with a surplus production system. This paper represents the author's personal perspectives on livestock system and the constraints that are seen in research systems regarding livestock system. Brief review on the animal health is also illustrated.

228 Sukmana, S.; Abdurachman, A.; Syarafuddin Karama, A. 1994. **Strategies to develop sustainable livestock on marginal land.** In Copland, J. W.; Dijajanegra, A.; Sabrani, M. (eds.) Agroforestry and animal production for human welfare: proceedings of an International Symposium held in association with the 7th AAAP Animal Science Congress on 11-16 Jul 1994 at Bali, Indonesia. (ACIAR [Australian Centre for International Agricultural Research] proceedings, 55). Canberra, ACT: Australian Centre for International Agricultural Research. 55-61p.

Keyword(s): *Livestock management / Animal husbandry / Land use*

Call No: 634.9 COA

Lang: En

Marginal land may be formed either naturally or by human activities. Human activities have created millions of hectares of degraded land in many watersheds. This paper refers mainly to research results obtained from farming systems research activities conducted in the Upland Agriculture and Conservation Project (UACP) target areas. The Upland Agriculture and Conservation Project (UACP) implemented in the upper watersheds of the Jratuneseluna (central Java) and the Brantas (east Java) from 1984 to 1993 was a government attempt to rehabilitate the degraded watersheds. The goal of the UACP as mentioned in this paper was to increase farm production and income while minimising soil erosion and promoting soil conservation. Additionally, strategies for livestock development on marginal, critical land, particularly in the upper watershed areas have been suggested.

229 Thomson, E. F.; Thomson, F. S. 1988. **Increasing small ruminant productivity in semiarid areas.** Dordrecht: Kluwer Academic Publishers. 296p.

Keyword(s): *Ruminants / Animal husbandry / Livestock management*

Call No: 636.2 THI

Lang: En

The proceedings include 24 overviewing papers presented at the workshop. The papers in the volume provides the background of the workshop, under three broad categories: livestock systems and nutrition, breeding and health. Recommendations formulated during the workshop for future research have also been included in the proceedings.

230 *United States. National Research Council. 1984. The water buffalo: new prospects for an under-utilized animal.* Washington, DC: United States. National Research Council. Washington, DC: National Academy Press. 118p.

Keyword(s): *Buffaloes / Animal husbandry*

Call No: 636.293 NAW

Lang: En

This report describes the water buffalo's attributes as perceived by several scientists. The book is designed to present the apparent strengths of buffaloes compared with those of cattle, to introduce researchers and administrators to the animal's potential and to identify priorities for buffalo research and testing. This report is an introduction to the water buffalo and its potential. The report includes much empirical observation, largely from the panel members. The panel reports serve to draw attention to neglected, but promising, technologies and resources for the development of water buffaloes.

231 *Van Soest, P. J. 1988. A comparison of grazing and browsing ruminants in the use of feed resources.* In Thomson, E. F.; Thomson, F. S. Increasing small ruminant productivity in semiarid areas. Dordrecht: Kluwer Academic Publishers. 67-79p.

Keyword(s): *Animal breeding / Animal feeding*

Call No: 636.2 THI

Lang: En

Differences in digestive ability and feeding behaviour are among the various possible evolutionary adaptations by which herbivores obtain their dietary needs and maintains some control or assurance of feed supply. The differences are integrated to give the nutritional strategy of each species. This paper presents a report on the comparison made for grazing and browsing ruminants in the use of feed resources. The focussed topics are digestive physiology and feeding behaviour, buffering and volatile fatty acids (VEA) absorption, rumen microbial adaptation, rumination, retention and digestive capacity, faecal metabolic output, selection and morphology of forages, shrubs and other browses and selection of feeding.

232 *Vandeplassche, M. 1982. Reproductive efficiency in cattle: a guideline for projects in developing countries.* (FAO Animal Production and Health Paper, 5). Rome: FAO. 118p.

Keyword(s): *Reproductivity / Developing countries / Livestock*

Call No: 636.082 VAR

Lang: En

This book is specifically intended for tropical and sub-tropical countries, taking into account the wide variation of cattle reproductive problems. Cattle play the dominant role in animal production -- their dominance largely depending on normal reproduction. It aims to provide veterinarians and animal production specialists with a useful "vade mecum" for the daily problems of fertility and infertility in cattle. The guide intends to cover all phases of the whole reproductive process, beginning with the physiology in the male and female, it also covers natural and artificial breeding, pregnancy, parturition, and the post-parturient period of the dam and calf, up to the point when normal fertility for renewed breeding is regained. All aspects are not considered academically, but emphasis has been laid on those practical problems of greatest economic importance which field workers are regularly confronted with in practice. To facilitate improvement in reproduction in developing countries, the guideline indicates a curriculum of veterinary study in which emphasis is placed on the essentials of the subject designed to meet most effectively the needs of the different regions, and also stresses on the importance of intensive clinical training in order to convince young graduates of the great potentialities of the subject.

Hindu Kush-Himalayan Region

233 *Yadav, Y. 1990. Farming - forestry - livestock linkages in mountain regions.* (MFS [Mountain Farming Systems] discussion paper, 14). Kathmandu: International Centre for Integrated Mountain Development. 16p.

Keyword(s): *Agroforestry / Livestock / Mountain farming systems*

Call No: 634.999 YAF P

Lang: En

This paper provides a brief account of the physical, socioeconomic and agricultural characteristics of the study sites; describes the linkages among the various components of mountain farming systems; and finally puts forward some important policy implications based on the findings of the study.

Afghanistan

234 Leyland, T. 1993. **Animal health care in Afghanistan.** *Appropriate technology* 19(4):29-32

Keyword(s): *Animal health / Animal husbandry / Afghanistan*

Call No: 604 P

Lang: En

Afghanistan is a land-locked country, where livestock is the major component in its agricultural system. A participatory rapid appraisal carried out by an NGO with the aid of the community, into agricultural production systems in the Daye Chopan area, one of the least developed area in Afghanistan is presented in this paper. The paper explores the indigenous knowledge possessed and the agricultural problems perceived by the community and has brought into light a severe animal health problem, affecting the poorest members of the community most seriously. The methodology used to find out the problems and the solution for the improvement of animal health care in Afghanistan is also presented and discussed.

Bangladesh

235 Huque, Q. M. E. 1993. **Indigenous animal species: conservation versus intensive production in Bangladesh.** *Asian livestock* 18(10):132-137

Keyword(s): *Traditional technology / Species / Animal production / Bangladesh*

Call No: 636 ASL

Lang: En

This paper briefly highlights the indigenous livestock and poultry species found in Bangladesh. Production and conservation of these indigenous genetic resources is also briefly discussed with various examples.

236 Jackson, M. G.; Dolberg, F.; Davis, C. H. (ed.) 1981 **Maximum Livestock Production from Minimum Land: proceedings of the seminar on Maximum Livestock Production from Minimum Land held on 2-5 Feb 1981 at Mymensingh, Bangladesh.** Dhaka: Bangladesh Agricultural University. 557p.

Keyword(s): *Livestock / Animal products / Bangladesh*

Call No: 636 JAM

Lang: En

The proceedings of the seminar on 'Maximum Livestock Production from Minimum Land' held on 2-5 February 1981 at Mymensingh, Bangladesh

includes 34 papers dealing with the challenges of maximum livestock production from minimum land presented at the seminar and two keynote addresses focussing on the theme. The papers have been included under seven broad headings as: straw as a livestock feed; supplementary feeds and feeding; animal power; ponds; farmer's view and experience; extension of new livestock technology to farmers; and livestock development policy. The conclusion and the recommendation obtained from the discussion made during the seminar have also been included.

237 Khan, N.; Lewis, D. J.; Sabri, A. A. 1993. **Proshika's livestock and social forestry programmes.** In Farrington, J.; Lewis, D. J.; Satish, S. (eds.) *Non-governmental organisations and the state in Asia: rethinking roles in sustainable agricultural development.* London: Routledge. 59-65p.

Keyword(s): *Livestock management / Community forestry / Community development / Development projects / Bangladesh*

Call No: 307.72 FAN

Lang: En

Results and relevant experiences from livestock and social forestry programmes carried by the second largest NGO (Proshika) in Bangladesh is presented in this paper. Additional, livestock situation in Bangladesh and the main aim of the NGO with special reference to livestock and social forestry programme is briefly highlighted.

238 Tareque, A. M. N.; Saadullah, M. 1988. **Feed availability requirements for animals and current patterns of utilization in Bangladesh.** In Devendra, C. (ed.) *Non-conventional Feed Resources and Fibrous Agricultural Residues: Strategies for Expanded Utilisation - proceedings of a consultation held on 21-29 Mar 1983 at Hisar, Ottawa, Ont: International Development Research Centre / New Delhi: Indian Council of Agricultural Research.* 116-130p.

Keyword(s): *Agricultural wastes / Waste utilization / Animal feeding / Bangladesh*

Call No: 636.085 DEN

Lang: En

This paper discusses the land use patterns by different crops, feed availability, feed balance and patterns of utilisation of feedstuffs in Bangladesh. The paper also discusses possibilities of improving the feeding value of crop-residues for evolving appropriate technology, as well as making more use of the non-conventional feeds to increase feed supplies in order to maximise productivity from animals. The importance of

development of a feeding standard for different species of animals is emphasised. In general, the paper highlights the feed resources, their availability and nutritive values, the requirement of nutrients for the livestock, present patterns of utilisation and current approaches to large-scale utilisation.

Bhutan

239 Bennett, P. R. 1980. **Bhutan: National Sheep Breeding Programme.** Rome: FAO. 23p.

Keyword(s): *Breeding methods / Livestock / Sheep / Bhutan*

Call No: 636.311 BEB P

Lang: En

This is a review report for 'National sheep breeding programme'. The report is based on the breeding trials being conducted at the project sites. The first part mainly focuses the future breeding policy and recommendations, while the second part highlights the information on 'National sheep population projection 1981-85'.

240 Bhutan. Animal Husbandry Department. 1984. **Project report on farmer's training in animal husbandry.** Thimphu: Bhutan. Animal Husbandry Department. 17p.

Keyword(s): *Training / Animal husbandry / Farmers / Bhutan*

Call No: 636 ANP P

Lang: En

This report presents in brief the information on farmers training in animal husbandry. The report briefly reviews the main points of the course aimed, followed by questions and answers and the evaluation of the course conducted.

241 Bhutan. Ministry of Development. Animal Husbandry Department. 1981. **Comprehensive policies and programmes of animal husbandry for Fifth Plan (1981-87).** Thimphu: Bhutan. Ministry of Development. Animal Husbandry Department. 83p.

Keyword(s): *Animal husbandry / Development plans / Project design / Bhutan*

Call No: 636 BHC

Lang: En

Comprehensive policies and programmes of animal husbandry for the Fifth Year Plan (1981-87) of Bhutan is presented in this document. Policies and programmes have been discussed for the development of cattle, pig, poultry, sheep and yak in different chapters. Policies and programmes for pasture, fodder and feed development is discussed and collection, processing and marketing of milk and

milk product is explained. Extension services and training programmes for animal health is also discussed.

242 FAO. 1981. **Bhutan: National Sheep and Yak Development Project - project findings and recommendations.** (Terminal report). Rome: FAO. 34p.

Keyword(s): *Yaks / Animal breeding / Wool / Grassland management / Livestock / Sheep / Bhutan*

Call No: 636.3 FOB P

Lang: En

Livestock husbandry is the mainstay of the people of Bhutan. Beside providing employment, it helps them in meeting their various requirements. Sheep and yaks are mostly reared in high altitude pastoral areas including the alpine pastures of Bhutan and their production problems are, therefore, closely interrelated. To support the national effort for achieving its goal of balanced and integrated development of sheep and yak husbandry, a project was launched in Bhutan to improve livestock husbandry through better feeding, management, and disease control. This document reviews the findings of the project and provides recommendations for the improvement of the livestock and pasture in terms of marketing and potential for the expansion of livestock husbandry.

243 FAO. 1981. **FAO/UNDP Agricultural Planning Mission to Bhutan: annex III - animal husbandry.** Rome: FAO. 67p.

Keyword(s): *Surveys / Animal husbandry / Agricultural planning / Bhutan*

Call No: 636 FOF

Lang: En

Animal husbandry is an integral part of farming in Bhutan. But, existing levels of consumption of animal products are low. This has been attributed to low animal productivity and development of animal husbandry have been constrained by a combination of factors including poor genetic quality of the animals, overgrazing of pastures, and a lack of adequate diagnostic and veterinary facilities to treat diseases. To overcome these problems and constraints several animal husbandry development programmes are planned, which are discussed in this paper. These programmes are directed at cattle, pigs, poultry, sheep, yaks, horses and fisheries activities. The main thrust of the majority of these projects as discussed in this document to improve productivity through improved genetic strains by crossbreeding animals with appropriate exotic breeds. In addition, the programmes aimed at improving productivity through improved health and nutritional levels is also illustrated. These projects

include pasture, fodder, and feed development activities; an animal health coverage programme emphasising vaccination and deworming procedures; and extension and training programmes to promote livestock development.

244 Hancoch, J. 1979. **National sheep and yak development project.** (Bhutan/72/010). Rome: FAO. 19p.

Keyword(s): *Yaks / Sheep / Wool / Technical cooperation / Land development / Animal breeding / Bhutan*

Call No: 636.3 HAN P

Lang: En

This document reviews the achievement obtained through the project 'National sheep and yak development'. The document briefly outlines the activities and requirements of the project in order to fulfil the programme and the follow-up action for the implementation of the project.

245 Miller, D. J. 1986. **Forest industries complex: equipment training and advisory services-consultancy in grazing control.** Rome: FAO. 49p.

Keyword(s): *Forestry/Grazing/Training / Bhutan*

Call No: 634.9 MIB P

Lang: En

Forests in Bhutan cover 64 per cent of the total land area and are an important resource for a growing wood-based industrial development, provide fuel, house-building timber for the people, watershed protection to Bhutan's rugged terrain and grazing areas for livestock. Livestock, particularly grazing animals, have traditionally been a very important part of the agricultural production system and the economy of Bhutan. This document reviews the problems caused by uncontrolled grazing on forest lands, in the Gedu Concession areas and in conifer forests in the Chelela area of the Paro Valley, particularly the effect on tree seedling survival and growth. This is followed by recommendations on ways and means that are socially and technically feasible to control grazing in forest lands, in general and in the Gedu Concession area in particular.

246 Tamang, D. B. 1988. **Feed availability, requirements for animals and current patterns of utilization in Bhutan.** In Devendra, C. (ed.) *Non-conventional Feed Resources and Fibrous Agricultural Residues: Strategies for Expanded Utilisation - proceedings of a consultation held on 21-29 Mar 1983 at Hisar.* Ottawa, Ont: International Development Research Centre / New Delhi: Indian Council of Agricultural Research. 131-138p.

Keyword(s): *Agricultural wastes / Waste utilisation / Animal feeding / Bhutan*

Call No: 636.085 DEN

Lang: En

Bhutan is a predominantly agricultural country, with 95 per cent of the labour force engaged in agricultural producing most of the cereals and other crops. Livestock are an integral part of agriculture in the country. Ruminants are traditionally raised by seasonal migration from alpine meadows to lower pastures. Pigs and poultry are maintained on free-range systems and are sometimes hand-fed with rejected grains, grain by-products or kitchen waste only. Ruminants are generally more important than non-ruminants. The country has a deficit of feeds and fodders. The main crop residue available are maize stovers, rice straws, and wheat straws. Agro-industrial by-products including milling by-products like rice bran, wheat bran, mustard oil cakes and by-products from apples, pineapple, and citrus. This paper deals mainly with the feed resources available, current pattern of utilisation of feed resources and future development policy of the government, through bilateral and multilateral assistance, the government has formulated firm plans and policies to improve and develop pastures.

China and the Tibetan Plateau

247 **A research on exploiting and utilizing the resources of feeds for livestock and poultry in Jaoyuan county, [China].** Research of agricultural modernization (4):42-46

Keyword(s): *Poultry / Feed crops / Livestock management / China*

Call No: 630.72 REA

Lang: Ch

248 Anderson, N.; Peter, D. W.; Masters, D. G. 1995. **Production of fine wool in northern China: effect of nutrition and helminth infections.** (ACIAR [Australian Centre for International Agricultural Research] technical reports). Canberra, ACT: Australian Centre for International Agricultural Research. 80p.

Keyword(s): *Wool / Nutrition / Animal diseases / Animal nutrition / Animal products / China*

Call No: 636.08845 ANP

Lang: En

This edited volume is the compilation of the papers on the topic 'production of fine wool in northern China: effect of nutrition and helminth infections'. The volume includes 14 technical papers on different aspects of the above.

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249 Cheng Xin. 1985. **Assessment and utilization of climatic condition for animal husbandry in north area around the lake of Qinghai province - taking Ganzi river as an example.** *Natural resources* (2):65-70

Keyword(s): *Grazing land / Animal husbandry / Climatic influence / China, Tibet*

Call No: 333.7 NAR

Lang: Ch

250 Huang Wenxiu. 1986. **Animal husbandry and watershed management in Himalaya-Hungdwan regions.** In Li Wenhua; Pandey, K. K. (ed.) *Watershed management: proceedings of the International Workshop on Watershed Management in the Hindu Kush-Himalayan Region* held on 14-19 Oct 1985 at Chengdu. Kathmandu: International Centre for Integrated Mountain Development / Beijing: Chinese Academy of Sciences. Commission for Integrated Survey of Natural Resources. 39-43p.

Keyword(s): *Mountains / Animal husbandry / Watershed management / China*

Call No: 333.716 LIW

Lang: En

The Himalayas-Hengdwan region situated in the southwestern part of China is the largest mountain region in the world. At the source of the Himalayas-Hengdwan Valley, topography is gentle with good vegetation and light erosion. Tibetan sheep and yak find excellent pasture on the plateaus, mountains, and lacustrine flats. The region is rich in agricultural by-products, for example fodder. Therefore, the characteristics of animal husbandry in context to rangelands found in the Himalayas-Hengdwan Valley are discussed in this paper. The direction of the development of animal husbandry and watershed management of the valley by decreasing free range animal grazing and increasing stall feeding to animals is also discussed. Growing artificial grasses and fodder crops in places where possible is also suggested.

251 Huang Wenxiu; Meng Youda; Cai Quanlin. 1981. **Domestic animals of Xizang (Tibet).** (The series of the scientific expedition to the Qinghai-Xizang Plateau). Beijing: Science Press. Commission for Integrated Survey of Natural Resources. 198pp.

Keyword(s): *Livestock / Pastures / Feed crops / Breeding / Domestic animals / China, Tibet Plateau*

Call No: 636 HUD

Lang: Ch

This paper offers the summary of field survey on livestock and animal husbandry along with routes

representing different physical and economic units of Xizang. The paper also covers ecological conditions for overall development of animals based on their spatial distribution; characteristics and types of animal husbandry; characteristics of various livestock resources; adaptability of animals that migrate from low altitudes to the Tibetan Plateau. The results of crossbreeding with local species; determination of normal physiological targets; and priorities for animal husbandry development have also been discussed.

252 *International Bank for Reconstruction and Development/World Bank.* 1987. **China: the livestock sector.** (A World Bank country study). Washington, DC: International Bank for Reconstruction and Development/World Bank. 196p.

Keyword(s): *Livestock/Animal husbandry/China*

Call No: 636 INC

Lang: En

The major policy issues hampering the development of the livestock sector are discussed in this paper, which include difficulties in making the transition from an administered to a market system; price distortion due largely to the scope of consumer and producer subsidies; insufficient reliance on interregional and international trade to solve problems of feed and livestock product supply; lack of functional specialisation within the industry; and various weaknesses of support services and the sectoral management structure. But the main report reviews the recent developments in China's livestock production the organisation of the sector, the emergence of Agricultural Trade Markets (ATMs) in large cities as a result of 1985 policy reforms, and influences determining future growth of urban demand for livestock products. Each component of the industry is examined in detail, including feed supply and processing, livestock and poultry breeding, animal health, and veterinary services, alternative production system, and product processing. The major findings of relevance to government policy is given in a summarised form.

253 Lin Yuanwen. 1992. **Current and potential development of agricultural and animal husbandry enterprises in Zhejiang province [China].** In Horne, P. M.; MacLeod, D. A.; Scott, J. M. (eds.) *Forages on red soils in China: proceedings of a Workshop* held on 22-25 Apr 1991 at Hunan Province, China. (ACIAR proceedings, 38). Canberra, ACT: Australian Centre for International Agricultural Research. 121-124p.

Keyword(s): *Agricultural development / Animal husbandry / China*

Call No: 633.2 HOF

Lang: En

Zhejiang Province is located on the southeast coast of China. The climate is sub-tropical with a strong monsoonal influence. Of the total soil area, 40 per cent is classed as red and 11 per cent as yellow soils. The red soil area is generally located in a transition zone between the cropping and forestry zones. Following clearing of forest, the soil has been reclaimed to support cropping and forestry plantations. This paper focuses and highlights the current cropping enterprises, productivity of Zhejiang red soils and potential for increased production with reference to animal husbandry.

254 Zhang Yiguang. 1985. *The climate for animal husbandry in Qinghai-Xizang plateau*. Natural resources (3):60-67

Keyword(s): *Climate / Livestock management / China, Tibet*

Call No: 333.7 NAR

Lang: Ch

India

255 Agricultural Finance Corporation Limited. 1986. *Report of the Integrated Sheep Development Project in U. P. hills*. Bombay: Agricultural Finance Corporation Limited. 2v(380+271)p.

Keyword(s): *Animal husbandry / Kumaun Himalayas / Garhwal Himalayas / Project management / Sheep / Integrated planning / India, UP*

Call No: 636.3 AGR

Lang: En

Sheep rearing in the hill region has been identified as a major subsidiary occupation particularly for the traditional sheep breeders of tribal origins in Uttarkashi, Chamoli and Pithoragarh districts. Due to inadequate infrastructural support and changing socioeconomic conditions, the sheep rearing activities are on the decline. Many constraints hampering sheep development are inadequate breeding facilities, limited fodder and grazing land, inadequate health cover and extension services, lack of marketing facilities and credit. To remove the aforesaid constraints an integrated sheep development project has been formulated. The project report has been prepared in two volumes. The first volume consists of the main report including the background, project area, description of the project, its implementation, justification and suggestions regarding the development of sheep and the second volume includes all annexes.

256 Agriculture Finance Corporation Limited. 1986. *Report of the Integrated Cattle Development Project in U. P. hills*. Bombay: Agriculture Finance Corporation Limited. 2v(336+219)p.

Keyword(s): *Cattle/ Integrated planning/ Animal husbandry/ Kumaun Himalayas/ Garhwal Himalayas/ Project management/ India, UP*

Call No: 636.2 AGR

Lang: En

The hill region of Uttar Pradesh is one of the economically backward and underdeveloped areas of the State. Economy of hill region is basically agricultural and 80 per cent of the population is reported to live in the villages and are engaged in agriculture and other subsidiary occupations. Livestock rearing is the second important occupation of the people. The rearing of cattle and buffalo in the hill areas is not remunerative due to low genetic potential as well as lack of proper health cover, management and low maintenance level and is carried out in the traditional manner. To boost the productivity of these animals, a scientific approach should be adopted so that all the prerequisites for its development are assured. In order to meet this long felt requirement, a project was assigned to prepare feasibility report of Integrated Cattle Development Project for the hill region. This volume provides the project report prepared in two volumes, the first volume embodies the main report regarding the background, project area, involvement of women in cattle rearing, the objectives and scope of the project, its implementation, justification and suggestion for livestock rearing and development and the second volume includes the annexes.

257 Ahuja, K.; Rathore, M. S. 1987. *Goats and goat keepers*. Jaipur: Institute of Development Studies / Jaipur: Printwell Publishers. 100p.

Keyword(s): *Goats / Animal husbandry / India*

Call No: 636.39 AHG

Lang: En

This book provides baseline information about goats and the goat rearing households from the socioeconomic perspective in the Ajmer Sirohi areas so as to help in the design of the future programme and the extension strategies of the Goat Project. The detailed findings with supporting data obtained in the survey is contained in six chapters of the main text which provides detailed quantitative information along with extensive cross tabulations. The summary of findings are included in Chapter Seven. The concluding chapter discusses the general policy implications arising out of the study as well as specific problems which may be stressed in the Goat Development Project being implemented in Rajasthan. All the factual data has been included in the main text or in the Annex tables.

258 Arya, S. L.; Agnihotri, Y.; Samra, J. S. 1994. **Watershed-management: changes in animal population structure, income, and cattle migration, Shiwaliks, India.** *Ambio: a journal of the human environment* 23(7):446-450

Keyword(s): *Watershed management / Animal husbandry / Cattle / India*

Call No: 304.2 AMB

Lang: En

The denudation of grasslands, low productivity of animal resources, general poverty, and resources starvation are some of the problems associated with environmental degradation in many foothill regions. The situation in India is reported to be acute due to excessive depletion of vegetation in the adjoining Himalayan ranges, which represent a quarter of India's forest reserves. This article presents the report which evaluates the effects of one watershed management programme on the animal husbandry sector including composition of cattle population, cattle migration, feed availability and fodder production in Bunga village in the Shiwalik region. The impact of cattle migration on village economy has also been discussed.

259 Bhadula, S. K. 1990. **Animal husbandry in the Himalayas: an appraisal of its present status and future prospects.** In Biswas, S. K. (ed.) *Strategy of development in the Himalayas: a profile of socio-economic change.* Calcutta: Institute of Social Research and Applied Anthropology. 210-235p.

Keyword(s): *Animal husbandry / Himalayas / Development policy*

Call No: 330.9 BIS

Lang: En

The Himalayan region is a large complex ecosystem. The entire region which is comprised of the northern and the northeastern belt has good livestock resources. The livestock raising systems in this region have been different for different hill areas as influenced by local social organisations and locally available cropping patterns and land use systems. This paper thus, describes the present social-crop-livestock systems and their future prospects in the Himalayas. The paper mainly focusses on the problems and recommendations under different headings.

260 Bhagwan, P. S. K.; Maru, A.; Lonkar, P. S. 1993. **Studies on goat production and fodder production management in Rajasthan - management of small ruminant diseases: proceedings of a Workshop held on 15-16 Jan 1993 at Jaipur, India.** Ajmer: Indo-Swiss Goat Development and Fodder Production Project / Jaipur: Institute of Development Studies. 100p.

Keyword(s): *Animal husbandry / Animal diseases / Ruminants / India*

Call No: 636.3 BHM

Lang: En

Small ruminants, comprising of sheep and goats are a predominant species in the livestock production systems of Rajasthan and western India. Disease is a major cause of economic wastage and inefficient production in livestock. It is also a major constraint in development of livestock and farming systems which provide livelihood to millions of rural families in the region. The risk of endemic disease contributes significantly to increase populations of these species and as a consequence, results in various degrees of overutilisation of resources. The proceedings include 13 technical papers presented at the workshop. The papers mainly focus on the diseases and their effects on small ruminant production in India, in general, and in Rajasthan in particular. Some papers evaluate their economic effect on the production system, while some evaluate the economic implications of disease and some identify the most important conditions and syndromes, and sustainable interventions to manage the diseases.

261 Bhat, P. N. 1993. **Management of information for livestock research development in India.** In Maru, A.; Itty, P.; de Groot, B. (eds.) *Information systems for livestock research and development in India: proceedings of a Workshop held on 1-3 Feb 1993 at Avikanagar, India.* Ajmer: Indo-Swiss Goat Development and Fodder Production Project / Jaipur: Institute of Development Studies. 17-20p.

Keyword(s): *Animal husbandry / Animal production / Information systems / Livestock management / India*

Call No: 636.3 MAI

Lang: En

The main achievement in animal and veterinary research, development and extension is the realisation of the importance information technology in livestock production. The adoption of information technology in the livestock sector in India has been slow but when applied it is bound to bring changes in a manner in which research, education, development and extension are carried out in livestock production. The most important change envisaged is in education, and development of human resource capable of applying and using this new technology is the biggest priority. Thus, there is a need to develop indigenous applications base in informatics for livestock research and development. The areas where this new technology can be applied is in education, resource conservation, disaster management and transfer of rural technologies. In this paper, the author has presented in brief the management of

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information for livestock research and development in India.

262 Biswas, J. C.; Ranga Rao, G. S. C. 1991. **Problem of livestock development in the Himalayan regions.** In Society for Himalayan Environmental Rehabilitation & Peoples' Action. Livestock development in the Himalayan regions of India. Lucknow: Society for Himalayan Environmental Rehabilitation & Peoples' Action. v.2(16-20)p.

Keyword(s): Livestock management / Himalayas

Call No: 636 SHL

Lang: En

India is one of the most important livestock rearing countries of the world. It ranks first in goat and sixth in sheep production. Economically, India is predominantly agrarian in nature and livestock plays a vital role in national income. Livestock farming combined with horticulture, agriculture and forestry remain the major occupations for the rural people. But the environmental factors affect livestock production through change in altitude, mean annual temperature, its seasonal and diurnal variation, rainfall, humidity and atmospheric pressure. The climatic factors coupled with poor grazing, traditional system of stock management, unimproved genotypes and morbidity and mortality, appear to be the major constraints in livestock development and these factors account for low productivity of animals in the region, which is briefly described in this paper.

263 de Groot, B.; Hoeggel, F. U.; Soni, R. L. 1993. **Information management in a goat development program experience from Rajasthan.** In Maru, A.; Itty, P.; de Groot, B. (eds.) Information systems for livestock research and development in India: proceedings of a Workshop held on 1-3 Feb 1993 at Avikanagar, India. Ajmer: Indo-Swiss Goat Development and Fodder Production Project / Jaipur: Institute of Development Studies. 35-45p.

Keyword(s): Animal husbandry / Goats / Information systems / Livestock management / India

Call No: 636.3 MAI

Lang: En

In this paper an overview is given of the experiences from the Indo-Swiss Goat Development and Fodder Production Project (ISGP) on collection and processing of data from its field performance recording scheme, base farm, extension programme, and action research. The set up of the performance recording scheme the BAKRI is also described.

Constraints encountered in improvement of data handling in the project are discussed and suggestions are made for a systematic set up of information management for a goat development programme.

264 Dhar, T. N. 1991. **Livestock problems of the Himalayan region.** In Society for Himalayan Environmental Rehabilitation & Peoples' Action. Livestock development in the Himalayan regions of India. Lucknow: Society for Himalayan Environmental Rehabilitation & Peoples' Action. v.2(1-10)p.

Keyword(s): Livestock management / Himalayas

Call No: 636 SHL

Lang: En

Livestock problems of the Himalayan region are presented in this paper. The paper starts with brief information on the natural resources, sources for economic condition and relationship among various factors. Then different livestock zones in the Himalayas are summarised followed by the main problem in livestock production, development and management. Additionally, problem areas and some of the suggested areas which need attention is also briefly listed.

265 India. Ministry of Agriculture. Dep. of Agriculture and Cooperation. Directorate of Economics and Statistics. 1984. **Indian livestock census 1977 - Bharatiya Pashu Ganana.** New Delhi: India. Ministry of Agriculture. Dep. of Agriculture and Cooperation. Directorate of Economics and Statistics. v.1221p.

Keyword(s): Livestock / Agricultural statistics / Statistical data / India

Call No: R 636.00212 INI

Lang: EnHi

This document presents data regarding the number of livestock, poultry, agricultural implements and machinery and fishing crafts in India based on the final returns of the '12th Livestock Census' held in 1977 in India. The present volume furnishes all Indian figures of the three census periods viz. 1966, 1972 and 1977 and the State-wise figures for two census periods with rural and urban break-up. The introductory part of the census draws data from a variety of sources. This is followed by statistical tables on number of livestock, poultry, agricultural implement and machinery and fishing crafts in India and then statistical tables on the same items are provided State-wise.

266 Indian Council of Agricultural Research. Publication and Information Division. 1985.

Livestock Production, Management and Development

Handbook of animal husbandry. New Delhi: Indian Council of Agricultural Research. Publication and Information Division. 788p.

Keyword(s): *Cattle / Livestock / Animal husbandry / India*

Call No: R 636.0202 INH

Lang: En

This is the revised volume for the first edition of the 'Handbook of Animal Husbandry', where besides the chapters on the breeding on livestock, animal nutrition, management, housing and hygiene; diseases caused by virus, bacteria and fungi and miscellaneous pathological conditions and disease; artificial insemination; dairying; beekeeping, and new chapters on pigs, meat and fisheries have been included. This book, thus, presents all the sources of information available to all involved in farming and many problems facing the animal husbandry work.

267 *Indian Council of Agricultural Research. 1982. Research in animal production.* New Delhi: Indian Council of Agricultural Research. 697p.

Keyword(s): *Fisheries / Livestock / Dairy products / Animal production / India*

Call No: 636.072 INR

Lang: En

This volume presents the significant results of research done in different fields of animal science and fisheries. The book has 26 chapters. Some of the important aspects dealt in the book are: the improvement of cattle and buffaloes through breeding; feeding and managing artificial insemination and fertility problems; sheep, goat, pigs and poultry production; dairy technology; marine and internal fishery resources; and pond culture techniques and fishery technology.

268 *Indian Society of Agricultural Economics. 1989. Livestock economy of India.* Bombay: Indian Society of Agricultural Economics. New Delhi: Oxford and IBH Pub. 245p.

Keyword(s): *Livestock / Animal power / Animal products / Animal breeding / India*

Call No: 636 INL

Lang: En

Livestock constitutes an important sector of the rural economy of India. Its role in diversifying rural economy, in augmenting income and employment, especially of the weaker sections and in improving the diet and nutrition of the rural population needs to be assessed and promoted. This book is the compilation of papers presented at the seminar on 'Livestock economy of India'. The volume embodies the keynote address delivered by Prof. A Vaidyanathan and twelve selected papers covering the various aspects of the main theme. The

proceedings of the seminar critically examine the important issues contained in the papers presented at the seminar and offer suggestions for the future development of the livestock economy in India.

269 *Jackson, M. G. 1985. A strategy for improving the productivity of livestock in the hills of Uttar Pradesh.* In Singh, J. H. (ed.) *Environmental Regeneration in Himalaya: concept and strategies - reports from the seminar on Environmental Regeneration in Himalaya: concept and strategies held on 24-26 Oct 1983 at Nainital.* Nainital: The Central Himalayan Environment Association / Nainital: Gyanodaya Prakashan. 130-154p.

Keyword(s): *Farming systems / Hills / Livestock management / Animal production / India, UP*

Call No: 304.2 SIR

Lang: En

Hill farming is largely a self-contained system in which land, livestock and people are tightly integrated. It would be inadequate to treat strategies regarding livestock as a separate subject from strategies regarding of agricultural and social institutions. This paper, therefore, attempts to describe the farming systems of Uttar Pradesh hills using an energy flow model and data that are available with a view to formulate appropriate strategies for the future. Additionally, the paper also identifies unwarranted current assumptions about the system, assumptions deriving for the most part from the economic theory built to describe agriculture in the industrialised, temperate countries of the world. Similarly, the elements of an appropriate strategy to improve the productivity of livestock are discussed. Finally, a new and more appropriate livestock development strategy for the future in the U.P. hills have been formulated.

270 *Joshi, B. P. 1990. Animal agriculture in the central Himalaya.* In Sah, N. K.; Bhatt, S. D.; Pandey, R. K. *Himalaya: environment, resources and development.* Almora: Shree Almora Book Depot. 477-481p.

Keyword(s): *Agriculture / Grazing lands / Livestock / Himalayas*

Call No: 551.431 SAH

Lang: En

High altitude animal production technology is thronged with different kinds of problems due to temperature, climate, low barometric pressure rarefaction of atmosphere, rugged terrain, etc. However, green forests, rich underwood vegetation, excellent alpine meadows and temperate climate offer favourable conditions for livestock raising. This paper focuses on animal agriculture as the source for the survival of the people in the Central Himalayas.

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The constraints, potential and the solution for the development of animal agriculture is also discussed in brief.

271 Kala, P. 1991. **Problems of animal husbandry in Kumaon Mandal.** In Society for Himalayan Environmental Rehabilitation & Peoples' Action. Livestock development in the Himalayan regions of India. Lucknow: Society for Himalayan Environmental Rehabilitation & Peoples' Action. v.2(48-53)p.

Keyword(s): *Animal husbandry / India*

Call No: 636 SHL

Lang: En

Kumaon Mandal (Nainital) consists of three districts viz. Nainital, Almora and Pithoragarh. The livestock plays an important role in the occupation of the villagers residing in these districts as livestock production is directly related to the economic conditions of the people. Their prosperity is linked with agriculture, animal husbandry, forestry and horticultural practices. Agriculture and animal husbandry is thus, the backbone of their livelihoods and is a laborious occupation. The poor production in agriculture and livestock rearing is due to many factors namely geographical terrain, climatic factors, poor quality of land and livestock and many other conditions, which have all been discussed in this paper.

272 Kamath, M. V. 1989. **Management Kurien-style: the story of the white revolution.** New Delhi: Konark Publishers. 422p.

Keyword(s): *Dairy industry / Milk production*

Call No: 637 KAM

Lang: En

This book gives the detail on the milk revolution which was brought by Dr. Kurien ushering in the White Revolution in India. This gives detail information on the Gujarat cooperative in India.

273 Kaul, P. N. 1988. **Role of rural women in goat rearing.** In Indian Council of Agricultural Research. Abstracts [of papers presented at] International Conference on Appropriate Agricultural Technologies for Farm Women: Future Research Strategy held on 30 Nov - 6 Dec 1988 at New Delhi. New Delhi: Indian Council of Agricultural Research. 72-72p.

Keyword(s): *Animal husbandry / Women's role / Goats*

Call No: 631 INI

Lang: En

Women in this part of the country are mostly illiterate and tradition-bound. The usual day-to-day routine of

rural women is described as goat-rearers, bringing out their specific role in goat-rearing. The customs and traditions in semi-arid regions of Uttar Pradesh are also given. Two case-studies are also briefly described. The observations of other workers in this area are also extracted. The importance of gender based division of labour and communication among rural females has also been emphasised.

274 Khanna, N. D.; Rai, A. K. 1993. **Milk production potential of Indian camel.** Asian livestock 18(2):19-20

Keyword(s): *Dairy products / Milk products / India*

Call No: 636 ASL

Lang: En

Camel is considered as the king of the desert and its milk can be an important supplementary to milk resources in India, thus benefiting the ever-increasing human population. This article discusses the potential of camel milk, its chemical and physical characteristics and nutritive value and suggestions for its improvement.

275 Mahanta, K. C. 1987. **Handbook of animal husbandry.** Guwahati: Omsons Publications. 612p.

Keyword(s): *Dairy cattle / Swine / Goats / Sheep / Horses / Domestic animals / India*

Call No: R 636.0202 MAH

Lang: En

Animal husbandry is a business and, therefore, economic consideration of the value and availability of materials loom larger in it than they do in the investigation of a purely scientific problem. Most animal husbandry problems, thus, arise from practical and economic considerations. Hence, animal husbandry practices must be changed and so do the books on animal husbandry. This book provides a clear understanding of the available information for improving livestock farming. The book has 40 chapters comprising six parts. All chapters dealing with dairy cattle are covered in the first part. Chapters on draught and dual purposes for cattle, swine, goats, sheep, horse and mules are covered in the second section of the first part, and in second, third, fourth and fifth parts. Chapters on housing of farm animals are included in the sixth part.

276 Maru, A. 1993. **Information systems for livestock research and development- an overview.** In Maru, A.; Itty, P.; de Groot, B. (eds.) Information systems for livestock research and development in India: proceedings of a Workshop held on 1-3 Feb 1993 at Avikanagar, India. Ajmer: Indo-Swiss Goat Development and

Fodder Production Project / Jaipur: Institute of Development Studies. 31-34p.

Keyword(s): *Animal husbandry / Information systems / Research and development / India*

Call No: 636.3 MAI

Lang: En

Information is an important development tool. It can accelerate and reinforce development of major resources: human, natural and financial. Information makes adaptation of technology easier, efficient and timely. The paper discusses the problems of data and information availability and processing in the livestock sector in India. It describes the areas of application of informatics and the impact of new information technologies.

277 Maru, A.; Itty, P.; de Groot, B. (eds.) 1993 **Information systems for livestock research and development in India: proceedings of a Workshop held on 1-3 Feb 1993 at Avikanagar, India.** Ajmer: Indo-Swiss Goat Development and Fodder Production Project / Jaipur: Institute of Development Studies. 144p.

Keyword(s): *Animal husbandry / Animal production / Information systems / Livestock management / India*

Call No: 636.3 MAI

Lang: En

Information is a critical resource in any research or development activity. Its appropriate management is vital to sustain a system. Livestock production in India is being rapidly organised from a subsistence mode to market orientation. The challenge before animal scientists is to improve the productivity of livestock and sustain it without causing ecological degradation. The present success of improving livestock productivity under semi-intensive and intensive systems has to spread to other areas in the rainfed regions of the country. This involves complex issues of conserving natural resource and their efficient use, breeding of better animals, their appropriate upkeep including prevention of disease, social and economic aspects of farmers raising the livestock, economics and marketing of the products, and more. The problems associated with these challenges can be resolved by more efficient use of information. The application of new information technology, which includes computers, appropriate software and telecommunications, will be required to bring about better and systematic use of information in the livestock sector. The proceedings include papers which mainly highlight the various facets involved in the management of information in livestock research and development. The recommendations made at the workshop is also included which is expected to pave the way for the future development of information systems for livestock research and development in India and elsewhere.

278 Moorti, T. V.; Vashist, G. D.; Oberoi, R. C. 1984. **Economics of sheep enterprise (a study of tribal area of Bharmaur Tehsil, District Chamba, H. P.).** (Agricultural economics publication, 14). Palampur: Himachal Pradesh Krishi Vishva Vidyalaya. Department of Agricultural Economics. 20p.

Keyword(s): *Animal husbandry / Sheep / Economic aspects / India, HP, Chamba*

Call No: 636.3 MOE P

Lang: En

The socioeconomic condition of sheep farmers, net returns from sheep farming and other crops, input-output relationship for wool production, and the impact of sheep enterprise on farm income, the study conducted in the tribal areas of Bharmaur Tehsil and Chamba district, Himachal Pradesh have been highlighted in this paper.

279 Mudgal, V. D.; Pradhan, K. 1988. **Animal feed resources and current patterns of utilization in India.** In Devendra, C. (ed.) *Non-conventional Feed Resources and Fibrous Agricultural Residues: Strategies for Expanded Utilization - proceedings of a Consultation held on 21-29 Mar 1988 at Hisar.* Ottawa, Ont: International Development Research Centre / New Delhi: Indian Council of Agricultural Research. 139-146p.

Keyword(s): *Agricultural wastes / Animal husbandry / Animal feeding / Feed crops / India*

Call No: 636.085 DEN

Lang: En

This paper addresses the animal feed resource situation and current patterns of utilisation in India. It lays emphasis on the shortfall of 44 per cent concentrates and 36 per cent green fodder for ruminants. Cereal straws have been found to be the most important feeds. It is well known that the improved breeds of livestock and poultry, unless fed properly, will not express acquired genetic potential under excellent health and environment. Improved breeding and health care are, therefore, no substitute for proper feeding. The organisation of research, involving the Indian Council of Agricultural Research, various Agricultural Universities, State Department of Animal husbandry, public and private organisations, as well as research and development programmes involving national and international agencies are also presented.

280 Negi, G. C. (1986). **Livestock development in Himachal Pradesh in retrospect and prospect.** Palampur: Himachal Pradesh Krishi Vishva Vidyalaya. 59p.

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Keyword(s): *Livestock management / India, HP*

Call No: 636 NEL

Lang: En

Himachal Pradesh is burdened with a very large population of livestock with inefficient and uneconomical production potentials. The area available for fodder and grasslands is already under pressure and is likely to further shrink in size as the human population is still showing a trend towards expansion. Increased production has to be managed from the shrinking resources. In this context, this document presents the past and future prospect regarding the livestock, grassland and fodder development in Himachal Pradesh, with brief information on the present status of livestock in the region.

281 Negi, C. C. 1990. **Livestock development in Himachal Pradesh: retrospect and prospect.** (MFS [Mountain Farming Systems] discussion paper, 7). Kathmandu: International Centre for Integrated Mountain Development. 31p.

Keyword(s): *Livestock management / Animal husbandry / India, HP*

Call No: 636 NEL P

Lang: En

This paper is a comprehensive overview of the status of animal husbandry in Himachal Pradesh. The paper highlights the importance of livestock to Himachal Pradesh, and discusses livestock development by subsectors providing different examples of livestock. Feed and fodder development is discussed through its present situation, prospects, its improvement, conservation, utilisation and silvipasture analysis. Finally, strategies recommended for the future and different programmes for the development of livestock is discussed and are presented. Grasses and legume species available in different zones and list of fodder trees given under different agro-climatic conditions of Himachal Pradesh are given in Annex I and II.

282 Nivasarkar, A. E.; Lata, S.; Sahai, R. 1993. **Information management system for conservation and development of livestock genetic resources.** In Maru, A.; Itty, P.; de Groot, B. (eds.) *Information systems for livestock research and development in India: proceedings of a Workshop held on 1-3 Feb 1993 at Avikanagar, India.* Ajmer: Indo-Swiss Goat Development and Fodder Production Project / Jaipur: Institute of Development Studies. 53-61p.

Keyword(s): *Animal husbandry / Genetic resources / Information systems / Genetic improvement / India*

Call No: 636.3 MAI

Lang: En

The National Bureau of Animal Genetic Resources and National Institute of Animal Genetics have been entrusted with the responsibility of characterising and evaluating the livestock and poultry genetic resources of the country and develop appropriate liaison with global agencies in a similar endeavor. This paper provides details of a computer data bank management software prepared at the National Bureau of Animal Genetic Resources for the management of livestock data. The user friendly software as mentioned in the paper, is considered as capable of running on small computers, is interactive with the user and is compatible with the main frame systems.

283 Parveen, S.; Himayatullah. 1990. **Livestock feeding in the Barani farming system of Punjab: an estimate of feed supply and demand.** *Sarhad journal of agriculture* 6(2):131-136

Keyword(s): *Animal feeding / Feed industry / Livestock / India, Punjab*

Call No: 630.05 SAJ

Lang: En

Livestock feed is the most important input in the livestock industry. Feed quality and its availability can be regarded as some of the prime most constraints affecting livestock production and productivity. The principal cause of poor animal performance is malnutrition. Thus, to sustain rapid growth in livestock production, large increase in livestock feed supplies will be essential. This paper deals with an accounting system which expresses feed requirements and availabilities on the same basis. Evaluation and analysis of the balance of feed requirements and demand is carried out and presented in this paper.

284 Patel, R. K.; Mehta, R. K. 1988. **Appropriate livestock production technologies for farm women.** In Indian Council of Agricultural Research. *Abstracts [of papers presented at] International Conference on Appropriate Agricultural Technologies for Farm Women: Future Research Strategy held on 30 Nov - 6 Dec 1988 at New Delhi.* New Delhi: Indian Council of Agricultural Research. 69-69p.

Keyword(s): *Livestock management / Appropriate technology / Women's participation*

Call No: 631 INI

Lang: En

Under the mixed farming system, women's contribution in generating family income through animal husbandry is very significant even though variable from zone to zone. Landless women work a

greater number of hours in dairying than men and their per hour earning from dairying is four times that from agriculture. Landless women spend 40 per cent of their time in the dairying profession whereas women from small farmers' category spend 33 per cent of their time. Women work for most of the dairy operations from fodder harvesting to its feeding, milking of cows and buffaloes, processing of milk for curd, butter, lassi and ghee as traditional practices. In certain zones, women work for both dairying and poultry. To improve their efficiency and generate more income for the family, a number of new proven technologies are possible in the dairy and poultry sectors. In the goat sector too, due to high involvement, almost the same type of technologies are required. In the poultry sector, training of women for availability of superior germplasm and balanced poultry feed would increase their family income. This paper, thus, presents in brief the appropriate livestock production technologies for farm women.

285 Pradhan, K. 1993. **Contribution of livestock as providers of high-quality protein food in India.** Asian livestock 18(4):40-45

Keyword(s): Livestock / Protein rich food / India

Call No: 636 ASL

Lang: En

This paper presents the contribution of livestock as the source of high quality protein food for the population in India. Foods from animal origin occupy a high place on the nutrition scale and is considered most essential for human health and survival. Also, compared to cereals and pulses, availability of foods from animal sources are widely variable, which have been highlighted in this paper. Suggestion to improve livestock production is also briefly discussed.

286 Rao, C. H. H. 1990. **Some interrelationships between agricultural technology, livestock economy, rural poverty and environment: an interstate analysis for India.** In Indian Society of Agricultural Economics. Agricultural development policy: adjustments and reorientation. Bombay: Indian Society of Agricultural Economics. New Delhi: Oxford & IBH Publishing Co. 155-194p.

Keyword(s): Agricultural technology / Livestock management / Rural poor / India

Call No: 630 INA

Lang: En

There is no commensurate effort to understand the interrelationships between agricultural technology, livestock economy, rural poverty and environment. These aspects are highly interrelated and it is difficult to understand the problems and prospects in any one sector without understanding the developments in the

other sectors. Similarly, the patterns of crop production and livestock growth have an impact on rural environment directly through the pressure they exert for expansion of area under cultivation and grazing and indirectly through the effect they have on the livelihood of the rural poor. Therefore, in the analysis of the impact of agricultural development on rural ecology, the environmentalists have focussed, in general, on the negative impact of agricultural development on rural ecology, therefore, their solutions for the regeneration of environment often come in conflict with the measures for raising farm productivity. There is, thus, a need to understand the causes of environmental degradation in the perspective of technological change in agriculture, the impact of livestock economy and rural poverty. The present paper represents a modest effort in this direction. An attempt has been made in this paper to study the interrelationships between the various sectors mentioned above, particularly insofar as they have a bearing on deforestation or environmental degradation.

287 Rathore, M. S. 1993. **Studies on goat production and fodder resource management in Rajasthan - marketing of goats in Rajasthan.** Ajmer: Indo-Swiss Goat Development and Fodder Production Project / Jaipur: Institute of Development Studies. 74p.

Keyword(s): Animal husbandry / Animal production / Marketing / Marketing policies / India

Call No: 636.3 RAM

Lang: En

In the difficult physical environment of arid and semi-arid area animal husbandry plays a critical role. However, the efforts needed to maximise the contribution of animal husbandry to the producers welfare, without deteriorating the already precarious environment, have not received adequate attention by the scientists, policy-makers, and bureaucrats. The social science researchers are no exceptions to this. In this volume, the author has presented the critical and marketing aspects of the goat enterprises. In this context, the author has assessed the domestic demand for goat meat as well as its export potential and has related these findings to the potential marketable surplus. Important parameters that have been identified and used in estimation have been discussed. The document then provides the report on the survey done for the structure and organisation of the marketing institutions, from village level to the metropolitan centres and beyond. Finally, the document indicates the areas where both these objectives, of enriching the small and marginal goat breeders, as well as contributing to the state finances, can be carried out without any major trade off.

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288 Sagar, V.; Ahuja, K. 1993. **Studies on goat production and fodder resource management in Rajasthan - economics of goat keeping in Rajasthan.** Ajmer: Indo-Swiss Goat Development and Fodder Production Project / Jaipur: Institute of Development Studies. 58p.

Keyword(s): *Animal husbandry / Ruminants / Animal production / India*

Call No: 636.3 SAM

Lang: En

Animal husbandry has been a very important component of the farming systems practiced in Rajasthan. It provides both inter- and intra-year stability in the levels of income and employment, besides adding to the nutritional value of food. This paper examines some important issues related to goats. These include sustainability of the goat numbers in the state, optimal herd size, importance of goat enterprise in rural economy, and the relationship between goat keeping and the environment. The conditions which could make goat keeping in arid and semi-arid parts of Rajasthan a profitable proposition have been delineated. The paper also indicates the condition in which goats would not damage the environment, but instead could compliment the environment of the region in a productive manner.

289 Sankhala, K. 1985. **Livestock grazing in India's national parks.** In McNeely, J. A.; Thorsell, J. W.; Chalise, S. R. (eds.) *People and protected areas in the Hindu Kush-Himalaya: proceedings of the International Workshop on the Management of National Parks and Protected Areas in the Hindu Kush-Himalaya* held on 6-11 May 1985 at Kathmandu, Nepal. Kathmandu: King Mahendra Trust for Nature Conservation / Kathmandu: International Centre for Integrated Mountain Development. 55-58p.

Keyword(s): *National parks / Grazing / Livestock management / India*

Call No: 333.783 MCP

Lang: En

A major management problem in India's national parks is livestock grazing. In the early years, grazing was tacitly permitted, but as it became clear that livestock were having a detrimental impact on the natural habitats, the national park authorities began to take steps to exclude domestic animals from at least some of the country's protected areas. Project tiger was an essential step, providing both focus and support at the highest level. Case studies from Ranthambhore and Desert National Park are provided in this paper.

290 Satish, S.; Farrington, J. 1993. **Bharatiya Agro-Industrial Foundation (BAIF): research programmes in livestock production, health and nutrition.** In Farrington, J.; Lewis, D. J.; Satish, S. (eds.) *Non-governmental organisations and the state in Asia: rethinking roles in sustainable agricultural development.* London: Routledge. 136-144p.

Keyword(s): *Animal health / Animal nutrition / Livestock management / Research / Nongovernmental organisations*

Call No: 307.72 FAN

Lang: En

Bharatiya agro-industries foundation (BAIF), a non-profit development research foundation, has been working on different aspects for cattle production programmes. It seeks to raise income and employment among the rural poor through the application of science and technology in the field of livestock production, health and nutrition. This paper reviews BAIF experience and its links with public sector research and extension institutes in three related areas of research and development: cross-breeding for dairy improvement, vaccine production, and animal nutrition.

291 Shah, C. H. 1986. **Animal husbandry.** In Dantwala, M. L. and others. *Indian agricultural development since independence: A collection of essays.* New Delhi: Oxford & IBH Publishing Co. 162-198p.

Keyword(s): *Animal husbandry / Livestock management / India*

Call No: 630.9 DAI

Lang: En

The livestock economy of India has several outstanding features and has gathered momentum only during the past decade. Its performance is based mainly on the changing composition of animals in favour of milk-yielding bovines. There is a widespread belief that preference for vegetarian food and a religious taboo against cow slaughter are the roots of the livestock problems of India. This paper discusses the nature and basis of the change and the problems faced in realising and raising the production potential.

292 Singh, R. 1992. **Production and marketing of wool and mutton in India: a case study of Himachal Pradesh.** New Delhi: Mittal Publications. 284p.

Keyword(s): *Animal husbandry / Animal products / Meat production / Wool producing animals / India, HP*

Call No: 636.31 SIP

Lang: En

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Animal husbandry plays an important role in rural economy in general and figures very prominently in the agro-pastoral farming systems. The nomadic pastoral farming systems are generally restricted to marginal climatic zones. The type of animals reared depends on the socioeconomic and agro-climatic conditions prevailing in the region concerned. This book examines, in considerable detail the complex and important issues of sheep and goats rearing practices, and the production and marketing patterns of wool and mutton by the migratory shepherds in the western Himalayan region, and suggest policy measures for this improvement. The socioeconomic condition has also been analysed. The book has been divided into eleven chapters. The first chapter highlights the importance of the study and the methodology adopted in the study. A brief review of the related studies conducted earlier is given in the second chapter. The third chapter gives an overall view of the region under study. The fourth chapter provides information on various sheep and goat development programmes in India. In the fifth chapter, a discussion on the socioeconomic characteristics of shepherd households is presented. Sheep and goat rearing practices in the study area are discussed in Chapter Six. The seventh chapter deals with economic analysis of sheep and wool production. The costs of and returns from goat-rearing and mutton production are discussed in Chapter Eight. The marketing patterns of wool and mutton are discussed in the ninth chapter. The estimates of employment and income of the sheep and goat rearing households are discussed in the tenth chapter. The last chapter provides the summary and the conclusion.

293 Singh, R. V.; Bhati, J. P. 1989. **A study of farming systems in high hills temperate dry zone of Himachal Pradesh: an analysis of pastoral farming system.** Kathmandu: International Centre for Integrated Mountain Development. 123p.

Keyword(s): *Farming systems / Mountain farming systems / Pastures / India, HP*

Call No: 631 SIS

Lang: En

Variation in the agro-climatic conditions have resulted into different farming situations in different zones of Himachal Pradesh. The present report describes the farming systems, farming-forestry-livestock linkages and the socioeconomic conditions prevailing in the high hills temperate dry zone of Himachal Pradesh.

294 Singh, R.; Swarup, R. 1985. **Economics of sheep rearing in Himachal Pradesh.** Shimla: Himachal Pradesh University. Agro-Economic Research Centre. 156p.

Keyword(s): *Animal husbandry / Sheep / Economic aspects / India, HP, Kinnaur*

Call No: 636.3 SIE

Lang: En

This document mainly analyses the economics of sheep rearing in the Himachal Pradesh. It includes information on the change in the number of livestock particularly sheep and their relationship with land resources in Himachal Pradesh. It describes the types of fodder available in that region as well as in the neighbouring areas. Evaluation of sheep development programmes is also discussed. The economics of sheep-rearing and its impact on income and employment of the people is detailed. Finally, some suggestions and recommendations are provided for making sheep-rearing a more attractive occupation.

295 Society for Himalayan Environmental Rehabilitation & Peoples' Action. 1991. **Livestock development in the Himalayan regions of India.** Lucknow: Society for Himalayan Environmental Rehabilitation & Peoples' Action. 2v(193+199)p.

Keyword(s): *Livestock management / Animal products / Himalayas / India*

Call No: 636 SHL

Lang: En

The issues related to agricultural development, including livestock development in hills is intimately associated with the effective communication of the technology to farm women, which have been briefly described in this paper. The paper also reveals the level of involvement in marketing, medical care, livestock breeding, and fodder collection. Personal and communicational characteristics of hill women is mainly focused and discussed in this paper to help plan for effective communication and extension strategies for rearing animals.

296 Soni, B. K. 1991. **Sustainable livestock production in the Himalayan region.** In Society for Himalayan Environmental Rehabilitation & Peoples' Action. Livestock development in the Himalayan regions of India. Lucknow: Society for Himalayan Environmental Rehabilitation & Peoples' Action. v.2(43-47)p.

Keyword(s): *Livestock management / Himalayas / Animal production*

Call No: 636 SHL

Lang: En

Sustainable development is the management and conservation of the natural resource base, and the orientation of technological and institutional change in such a manner as to ensure the attainment and continued satisfaction of human needs for present

and future generations. Such sustainable developed conserved land, water, plant and animal genetic resources, is environmentally nondegrading, technically appropriate, economically viable, and socially acceptable. Applying these definitions, sustainable livestock production in the Malayan region is discussed in this paper.

297 Varma, A.; Sampath, K. T.; Yadav, B. P.; Roy, D. J. 1982. **Livestock feeds and feeding habits in North Eastern hills of India.** (ICAR research bulletin, 17). Shillong: Indian Council of Agricultural Research. Research Complex for N.E.H. Region. Animal Nutrition Division. 2v.(153)p.

Keyword(s): *Livestock management / Feed crops / Animal feeding / India*

Call No: 636.084 VAL

Lang: En

Nature is the primary source of human requirements. Human race has domesticated crops and livestock for its benefit. Wild form of these domesticated species are still found in different regions. There should be a balance between natural resources utilisation and regeneration. This balance is now upset due to population expansion and natural pollution. Many schemes have been launched to check further deterioration in India. The present dissertation on livestock feeds and feeding habits in north eastern hill of India is presented in two volumes. The first volume deals with an approach for livestock development in the northeastern hill region and includes information on all natural products consumed by the local livestock. Productivity of indigenous feeds and local feeding practices are also evaluated. The second volume presents a brief outline of some basic aspects of animal nutrition and includes information on the prospects of fodder production, conservation and utilisation in different agro-climatic zones of the northeastern hill region. The volume also provides immediate solutions to the problems of soil conservation, fertility built-up, fodder production, conservation, and animal nutrition.

298 Vashist, G. D. 1984. **A comparative economic evaluation of the government Cattle Breeding Farm Kamand(Mandi) and Indo-New Zealand Livestock Improvement Project (INLIP), Palampur (Kangra).** (Agricultural economics publication, 24). Palampur: Himachal Pradesh Krishi Vishva Vidyalaya. Department of Agricultural Economics. 20p.

Keyword(s): *Economic evaluation / Animal breeding / India, HP, Mandi / India, HP, Kangra*

Call No: 636.082 VAC P

Lang: En

Based on the constraint felt at the Government Cattle Feeding Farm, Kamand (Modi) and the Indo-New Zealand Livestock Improvement Project, Palampur (Kangra), a comparative report on the economic evaluation of both cattle breeding farms is presented in this document. A brief review of the history, objectives, resources and achievement of both cattle breeding farms is also given. Finally, it is pledged that the findings and suggestions will be adopted.

Myanmar

299 Than, Timt. 1993. **Livestock as a source of high-quality food in Myanmar.** Asian livestock 18(2):22-24

Keyword(s): *Livestock / Protein rich food / Dairy products / Myanmar*

Call No: 636 ASL

Lang: En

This article highlights the importance of livestock as a source of high quality food in Myanmar emphasising mainly the available livestock industry. Short descriptions of common livestock population found in Myanmar are also given.

300 Tint, L. 1993. **Utilization of indigenous animal species in Myanmar.** Asian livestock 18(10):115-119

Keyword(s): *Animals / Traditional technology / Species / Myanmar*

Call No: 636 ASL

Lang: En

Nature has provided Myanmar with diverse species of animals. Most of these species are known to be utilised as a gift of nature, by hunting at will. Several species are maintained in captivity, tamed and some of these have become the established breeds of livestock today. In this context, the paper focusses on the utilisation of indigenous animal species (elephant, buffalo, cattle, sheep, goats, poultry, and pig) in Myanmar.

Nepal

301 Agricultural Projects Services Centre. 1980. **Feasibility study of livestock development project Tanahu and Lamjung.** Kathmandu: Agricultural Projects Services Centre.

Keyword(s): *Livestock management / Development projects / Nepal, WDR*

Call No: 636 LID 19

Lang: En

This document presents the results of the 'Feasibility study of livestock development project in Tanahu and

Lamjung'. Background, objectives, and the methodology are presented in the first half of the paper. The second half outlines the recommendations focussed on introducing improved breeds, upgrading of economically-low productivity animals, and the development of necessary marketing infrastructure based on the survey and findings. Benefits and the justification of the project are provided in the last chapter.

302 *Agricultural Projects Services Centre. 1985. Integration of population with agriculture, livestock and forest; case study and action plan design for terai and hill panchayats.* Kathmandu: Agricultural Projects Services Centre. 202p.

Keyword(s): *Population / Livestock management / Agriculture / Forestry / Nepal*

Call No: 304.6 AGI

Lang: En

Development programmes are meant to the enhance living standards of the population, yet explicit concern over population is lacking in development programmes in Nepal. Recently, population, the missing link, is being explicitly incorporated into the development programmes such that a harmonious relationship between population and development efforts can be affected. Present report attempts to show the relationship of population with agriculture, livestock and forest. A case study of Aurahi and Harichaur village panchayat is provided with prepared participatory and replicable action plans for the above two village panchayat.

303 *Agricultural Projects Services Centre. 1980. Livestock component.* In *Agricultural Projects Services Centre. Feasibility study of Rapti Zone Integrated Rural Development Project.* Kathmandu: Agricultural Projects Services Centre. v3, annex 3, 123p. Kathmandu: Agricultural Projects Services Centre.

Keyword(s): *Livestock / Development projects*

Call No: 307.72 RAI 5

Lang: En

This document presents a project report for livestock in the Rapti zone. The document focusses on the characteristics of livestock in the project area; its products, pastures and fodder situation; animal health, animal disease, and animal health services; along with the major constraints to livestock development and current feeding practices. The objectives of the project regarding livestock are outlined and the project proposals are also discussed in terms of various aspects required for livestock development.

304 *Agricultural Projects Services Centre. 1979. Livestock production.* In *Agricultural Projects Services Centre / South-East Consortium for International Development. Resource Conservation and Utilization Project.* Kathmandu: Agricultural Projects Services Centre / Chapel Hill, NC: South-East Consortium for International Development. 3v, annex 1ap. Kathmandu: Agricultural Projects Services Centre.

Keyword(s): *Animal husbandry / Livestock management / Nepal*

Call No: 333.7 REC 4

Livestock rearing is an integral part of agricultural farming and has become one of the main sources of food and income for rural hill people. Therefore, animal husbandry is regarded as an indispensable element of the resource conservation and utilisation project. This document focusses on the present situation of livestock and animal husbandry system in the project area. The characteristics and the performances of local breeds of animal are described, followed by detailed information on livestock production, marketing and the disease situation which is considered the major constraint. A summary of livestock development proposed programme for different catchment areas is also given.

305 *Agricultural Projects Services Centre. 1985. A study on livestock development activities: Bhaktapur, Kabhrepalanchowk and Sarlahi district.* Kathmandu: Agricultural Projects Services Centre. 91p.

Keyword(s): *Animal husbandry / Livestock management / Development policy / Nepal, CDR, Bhaktapur / Nepal, CDR, Kabhrepalanchok*

Call No: 636 AGS

Lang: En

Livestock development activities undertaken by the government in four areas: achievement of physical targets; accessibility to services; ratio of local and improved animals; and total livestock production and productivity at Bhaktapur, Kabhrepalanchowk and Sarlahi Districts have been discussed. Growth rate of the livestock production and impact of artificial and natural breeding programmes in livestock productivity, its achievements and impact on socioeconomic conditions of the participating districts are discussed. Additionally, the profile of all three study areas and recommendations regarding the livestock development is also included in this document.

306 Alirol, P. 1979. **Transhuming animal husbandry systems in the Kalingchowk region, central Nepal: a comprehensive study of animal husbandry on the southern slopes of the Himalayas.** Kathmandu: Swiss Association for Technical Assistance. 279p.

Keyword(s): *Feed crops / Grazing lands / Pastures / Livestock / Nepal*

Call No: 636 ALT

Lang: En

The Kalingchowk region is one of the most important regions in Nepal in terms of animal husbandry and having a big animal production potential. This document points out the transhuming animal husbandry systems in the Kalingchowk region. The report is divided into six parts. The first two parts deal with the environment and the general economic role of animal husbandry in the region. The environment is not described for itself but only in order to settle the frame where the animal husbandry practices take place. Only the factors which are related to the pastoral system are considered. The general economic role of animal husbandry is described through seven short monographs. The analysis of these systems have been carried out by the means of a model. The components of the system are inventoried and described in the third part. The network of the interrelations between different factors are also dealt with in this part. The fourth part concerns the functioning of the system, which concentrates on the production functions and the production process. In the fifth part the products of animal husbandry are described and the sixth part attempts to identify and classify the main constraints and proposes some of the improvements in terms of animal husbandry.

307 Asian Development Bank / Agricultural Projects Services Centre. 1993. **Livestock master plan.** Manila: Asian Development Bank / Kathmandu: Agricultural Projects Services Centre. 3v. (33+585+537)p.

Keyword(s): *Livestock / Livestock management / Dairy products / Meat production / Development planning / Development plans / Nepal*

Call No: 636 ASL

Lang: En

The Livestock Master Plan is presented as a set of three volumes. First volume provides an overview on 'A Strategy for Livestock Development'. The second volume contains the plan itself, which has been prepared using a systems approach. The plan provides the framework within which livestock development is to be managed during the next twenty years. The plan, therefore, reflects not only the information, experience and considered opinion

contributed by a broad range of national and community leaders, professionals, farmers and other individuals involved with livestock development in Nepal, but also the spirit of change occurring in the country. It is consistent with the political and development philosophies of the current administration, and with the planning undertaken by the National Planning Commission to document these changes. Volume II is extensively cross referenced to Volume III, which contains the most comprehensive set of data assembled on livestock in Nepal, and provides a database for planning, monitoring and evaluation of livestock development in the future.

308 Asian Development Bank. 1985. **Appraisal report of the proposed second Livestock Development Project in Nepal.** Manila: Asian Development Bank. 124p.

Keyword(s): *Animal husbandry / Livestock management / Economic aid / Nepal*

Call No: 636 ASA

Lang: En

Livestock are an indispensable part of the agricultural production system in Nepal. They provide almost all the draft power for cultivation, their dung is extensively used as manure, and they provide most of the power for rural transportation. Livestock products are essential subsistence food items for the farming community as well as a source of cash income generation through trading. This document presents an appraisal report of the proposed Second Livestock Development Project in Nepal. The report mainly focusses on the programme of the project on the improvement of disease control, livestock extension, and support services reaching down to the village level to improve the health and productivity of livestock in Nepal. Details of the project design, its implementation arrangement programme, and financial and economic evaluation of the project cost are also detailed here.

309 Ayre-Smith, R.; Kossila, V.; Servoz, H. 1984. **Report on livestock development and animal feed resource strategies in Nepal.** Rome: FAO. 43p.

Keyword(s): *Animal husbandry / Livestock / Feeds / Nepal*

Call No: 636 AYR P

Lang: En

This is a report presented by an FAO Livestock Development and Feed Resource Mission. In this report, background data about the country that is relevant to the livestock industry have been assembled and presented in Annex I. A number of observations and findings, together with recommendations for short, medium, and long term

projects that are aimed both at strengthening the institutional capacity of the Department of Livestock Development and Animal Health to perform efficiently and effectively, apart from providing new technologies in areas where there is a serious lack of reliable information. Feed resource development and problems in livestock in Nepal are described with its lack in monitoring, evaluation, and planning. The mission has also described an emergency situation and an emergency project that dealt with it. Recommendations on the basis of its observations have also been provided, mainly for the institutional strengthening and development in the areas of animal nutrition and range management, extension and livestock technician training, and monitoring, evaluation and livestock development planning.

310 Bhattarai, P. P.; Katuwal, S. R.; Gatenby, R. M. 1990. **Women's work with livestock.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 102-102p.

Keyword(s): *Livestock / Women workers / Women's participation*

Call No: 630.72636 GAL 45 **Lang:** En

This paper puts forward the role of women in livestock production in brief.

311 Brower, B. 1990. **Range conservation and Sherpa livestock management in Khumbu, Nepal.** Mountain research and development 10(1):34-42

Keyword(s): *Pasture management / Livestock management / Nepal*

Call No: 551.432 MOD **Lang:** En

This paper describes the animal husbandry practices in a Sherpa community in the broader context of Khumbu's natural environment, economy, and society and also explores both reasons behind, and also responses to the erosion of a traditional range conservation system.

312 Chaffey, P.; Grose, C. 1990. **A discussion on the role of livestock in sustainable agricultural systems in Nepal.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre,*

Dhankuta, Nepal. Dhankuta: Pakhribas Agricultural Centre. 100-100p.

Keyword(s): *Farming systems / Livestock / Agricultural development / Nepal*

Call No: 630.72636 GAL 45 **Lang:** En

This paper presents the abstract for the paper on the role of livestock in sustainable agricultural systems in Nepal, which puts forward ideas and points for discussion on why and how the above objectives should be achieved.

313 Chand, S. P. 1990. **Crop livestock interactions: practices and prospects in the hills of Nepal.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 99-99p.

Keyword(s): *Livestock / Feed crops / Hills / Nepal*

Call No: 630.72636 GAL 45 **Lang:** En

This paper briefly reviews work on crop research in relation to livestock development in Nepal, with particular reference to hill agriculture. Findings, of crop research at Pakhribas Agricultural Centre and other hill research stations which relate to livestock production are discussed. Finally, the paper deals with future prospects of crop-livestock interactions, concentrating mainly on the area of joint research.

314 Chemjong, P. B.; Kshatri, B. B.; Shrestha, S. R. 1990. **Supplementation of straw-based diets for lactating buffaloes in the eastern hills of Nepal.** (PAC technical paper, 123). Dhankuta: Pakhribas Agricultural Centre. 9p.

Keyword(s): *Animal feeding / Animal husbandry / Buffaloes / Nepal, EDR*

Call No: 630.7263608 CHS 45 **Lang:** En

Rice straw is used for many purposes in Nepal. In this paper, use of rice straw as a feed for livestock is reported. Methods of supplementing rice straw to improve productivity of lactating buffaloes have been studied and the result obtained from the experiment is presented in this paper. Basically, four methods of supplementing rice straw have been compared in this report in terms of milk production and financial gains.

315 Development Research and Communication Group. 1982. **A case study on**

Livestock Production, Management and Development

livestock development component
Rasuwa/Nuwakot Rural Development Project.
 Kathmandu: Development Research and
 Communication Group.

Keyword(s): *Livestock management /
 Development projects / Nepal, CDR*

Call No: 307.72636 RAN 3 **Lang:** En

Animal husbandry practices constitute a major share of the total farming operations. This document presents the report for a case study done for livestock development component by Rasuwa and Nuwakot Rural Development Project. The main approaches outlined in this report regarding the livestock programme are disease control, improved nutrition especially during winter and upgrading the genetic quality. Three major types of livestock development activities identified are extension and education activities, research activities and productivities. Three main production programmes outlined with illustration are animal health service programme, breed improvement programme, and pasture and fodder improvement programme. Conclusion and recommendations based on these three programmes are also given.

316 Dhakal, I. P.; Kharel, M. 1988. **Common diseases of livestock in Chitwan district of Nepal.** Journal of the Institute of Agriculture and Animal Science 9:69-74

Keyword(s): *Livestock / Animal diseases / Nepal, CDR, Chitwan*

Call No: 630.5 JOI **Lang:** En

Observations on the most prevalent diseases of farm animals in the Chitwan District have been made in this paper by analysing the records of three years (1981, 1982, and 1983) from the Veterinary Hospital, located at Bharatpur and its subcentres in the Chitwan District. According to the paper, cattle, buffaloes, and goats were the most common animals brought into the hospital and its subcentres. The most common diseases diagnosed by the veterinarians and their assistants were liverfluke, foot and mouth-diseases, roundworm, pneumonia, haemorrhagic septicemia, and mastitis. Effect of season on the outbreak of disease has also been discussed.

317 Field, D. I.; Yadav, R. N. 1990. **Livestock in K-Bird project.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 123-123p.

Keyword(s): *Livestock / Development projects*

Call No: 630.72636 GAL 45 **Lang:** En

The abstract points out the livestock situation, value and problems in K-Bird project.

318 Fox, J. M. 1987. **Livestock ownership patterns in a Nepali village.** Mountain research and development 7(2):169-172

Keyword(s): *Livestock, / Livestock management / Nepal*

Call No: 551.432 MOD **Lang:** En

Reports indicate that the livestock populations of Nepal exceed available feed resources and that overgrazing causes severe land degradation. Knowledge of livestock ownership patterns and factors that influence livestock ownership is thus important to land management programmes, which have been explained and described in this paper. Attention has been given to the relative importance of the Hindu religion and economic incentives to cattle and buffalo ownership patterns among farmers. Finally, the paper concludes by stressing that the farm size and caste both affect livestock ownership.

319 Gatenby, R. M.; Chemjong, P. B.; Pakhrin, B. 1990. **Production of pigs in the Koshi hills.** (PAC technical paper, 125). Dhankuta: Pakhribas Agricultural Centre. 19p.

Keyword(s): *Animal production / Animal husbandry / Nepal, EDR*

Call No: 630.72636 GAP 45 **Lang:** En

This paper aims to describe the reproductive traits of the local and Pakhribas crossbreed pigs in the Koshi hills, and also identifies the most serious constraints and suggests ways in which pig production could be improved. The main recommendation provided in this paper is that the Pakhribas pigs should be introduced in the villages as their growth and reproductive performance is better than that of local pigs.

320 Gatenby, R. M.; Chemjong, P. B.; Kshatri, B. B. 1990. **Reproduction of goats and sheep in the Koshi hills.** (PAC technical paper, 136). Dhankuta: Pakhribas Agricultural Centre. 20p.

Keyword(s): *Goats / Sheep / Animal production / Nepal, EDR*

Call No: 630.726363 GAR 45 **Lang:** En

This report describes the major reproductive parameters of goats and sheep on farms, and compares the performance of local and introduced genotypes. The paper also describes the systems of reproductive management and identifies the key factors which could be improved upon.

321 Gatenby, R. M.; Neopane, S. P.; Shrestha, N. P. 1988. **Description of farm animals in the Koshi hills.** (PAC technical paper, 98). Dhankuta: Pakhribas Agricultural Centre. 22p.

Keyword(s): *Animal husbandry / Hills / Nepal, EDR*

Call No: 630.7236 PAA 45 **Lang:** En

A report based on the survey conducted in 11 panchayats of the Koshi Hills to describe the farm animals is given in this document. The survey described in this paper constitutes the first part of a study of production systems in the Koshi Hills. Basic information about the animals is provided as background knowledge. The data are summarised in tables.

322 Gatenby, R. M.; Pearson, R. A.; Limbu, T. B. 1990. **A survey of local and jersey crossbred draught oxen in the hills of east Nepal.** (PAC technical paper, 128). Dhankuta: Pakhribas Agricultural Centre. 18p.

Keyword(s): *Animal husbandry / Cross breeding / Hills / Nepal, EDR*

Call No: 630.726362 GAS 45 **Lang:** En

In the hills of East Nepal, fields are cultivated by pair of oxen, and Jersey bulls are used for crossing with local cows to obtain more milk. This report describes a better understanding of the use of draught oxen in the eastern hills of Nepal and also compares the Jersey crossbred with local oxen.

323 Gatenby, R. M.; Phemjong, P. B. 1990. **On-farm experiments with livestock: practical and statistical considerations.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 131-131p.

Keyword(s): *Livestock / Agricultural research*

Call No: 630.72636 GAL 45 **Lang:** En

The summary highlights the on-farm experiments with livestock obtaining statistically significant results.

324 Gatenby, R. M.; Thapa, B.; Shrestha, N. P. (eds.) 1990 **Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.** Dhankuta: Pakhribas Agricultural Centre. 131p.

Keyword(s): *Livestock / Animal production / Hills / Animal breeding / Nepal*

Call No: 630.72636 GAL 45 **Lang:** En

The proceedings includes eight papers each dealing with the improvement of livestock production, income generation through livestock, fodder production and various aspects in livestock management. Beside this, 33 papers presented at the workshop have also been included in this volume under six broad headings as: systems of production, fodder for ruminants, pig and poultry, animal health, development projects and training and research.

325 Gurung, H. B. 1987. **Agriculture, horticulture and livestock planning.** In Gurung, S. B.; Roy, P. (eds.) *Planning with people: decentralisation in Nepal.* New Delhi: Orient Longman. 82-99p.

Keyword(s): *Livestock / Agricultural production / Horticulture / Nepal*

Call No: 338.9 GUP **Lang:** En

Agriculture is the dominant economic sector in Nepal, in fact, it is the backbone of Nepal's economy. Keeping these fact in view, the agricultural sector has been given topmost priority since the Sixth Five-year Plan period. This paper provides different planning sectors for agriculture, horticulture, and livestock. Steps for agricultural development planning is based on the intensity of activities. Main guidelines for preparing the district level agriculture plan and guidelines for planning village panchayat agricultural development programme is provided. Finally, based on these guidelines a case study of Nuwakot district is presented.

326 Gurung, H. B. 1989. **A study on growth rate of local, crossbred and exotic breeds of pigs and carcass evaluation of local pigs.** (PAC technical paper, 116). Dhankuta: Pakhribas Agricultural Centre. 6p.

Keyword(s): *Animal husbandry / Cross breeding / Animal breeding / Nepal*

Call No: 630.7263608 GUS 45 **Lang:** En

This paper attempts to examine the carcass yield of local pigs reared in villages in the area. In order to compare the growth rate of pigs, nine castrated local male piglets were used. The feeding management and weight gain measurements were studied under farmer's management conditions for a period of 48 weeks and finally their carcasses were evaluated.

327 Jodha, N. S.; Shrestha, S. 1990. **Some conceptual issues of livestock farming in the**

mountains. (MFS [Mountain Farming Systems] discussion paper, 4). Kathmandu: International Centre for Integrated Mountain Development. 11p.

Keyword(s): *Animal husbandry / Livestock*

Call No: 636 JOS P

Lang: En

This paper, based on the work at ICIMOD on strategies for sustainable mountain agriculture, illustrates the situation with reference to livestock farming in the mountain areas of Nepal. It first introduces the major characteristics of mountain areas and their operational implications. These characteristics called mountain specificities here, include inaccessibility, fragility, marginality, diversity, niche, and people's adaptation mechanisms in their habitat. The implication of mountain specificities can be seen as development imperatives as well as the prospective attributes of the development interventions. This is indicated with reference to policies and programmes for livestock in mountain areas. This paper examines the coverages between imperatives of mountain conditions and attributes of livestock farming in the hills/mountains.

328 Joshi, B. R. 1989. **Research needs in parasitic diseases of livestock.** In Yazman, J. A.; Oli, K. P. Proceedings of the Workshop on Research Needs in Livestock Production and Animal Health in Nepal held on 1-7 Jan 1989 at Kathmandu. Lalitpur: Nepal. National Agricultural Research and Services Centre. Central Livestock Development Centre. 106-115p.

Keyword(s): *Animal diseases / Livestock / Nepal*

Call No: 636 YAP

Lang: En

Parasitic diseases of livestock constitute a major limiting factor of animal productivity on small farms in Nepal. The state of knowledge regarding various parasitic diseases is very limited due to lack of research on animal health and production in Nepal. This situation is due to many factors, but primarily due to the lack of research institutions which have a commitment to animal health and production research and infrastructure for the proper diagnosis of animal diseases. As a result, animal health research is not progressing and the country depends upon traditional methods of disease control. The existing situation of parasitic diseases of farm livestock and the research to be conducted for each disease is presented in this paper. Parasitic diseases of other animals are not discussed.

329 Joshi, D. D. 1980. **Livestock survey and some development proposals for Karnali and**

Bheri zones. Kathmandu: Karnali-Bheri Integrated Rural Development Project. 62p.

Keyword(s): *Livestock / Animal production / Project design / Nepal, MWDR*

Call No: 307.72636 KAB 47

Lang: En

Livestock could be considered the missing link for increasing crop production in the hills and terai because it converts forage from land otherwise useless for crop production, into the basic soil nutrients for arable soils. In energy terms, livestock harvest solar energy inherent in forage and crop residue and convert it into a form usable by humans. In the Mahabharat hills, livestock are also a principle source of cash income. Livestock also constitute the only nonhuman source of draught power. This document presents the report on the livestock survey made in Karnali and Bheri zones, which point out the important role of livestock. The report also provides some development proposals which are required to bring the livestock sector forward.

330 Joshi, N. P. 1988. **Feed availability, requirements for animals and current patterns of utilization in Nepal.** In Devendra, C. (ed.) Non-conventional Feed Resources and Fibrous Agriculture Residues: Strategies for Expanded Utilization - proceedings of a Consultation held on 21-29 Mar 1988 at Hisar. Ottawa, Ont: International Development Research Centre / New Delhi: Indian Council of Agricultural Research. 147-157p.

Keyword(s): *Agricultural wastes / Animal husbandry / Animal feeding / Feed crops / Nepal*

Call No: 636.085 DEN

Lang: En

Nepal has the densest livestock in terms of per unit of cultivated land. The major sources of feed are crop by-products, forest resources, and grazing lands. In general, there is adequate feed and fodder during the monsoon season but, for the rest of the year the animals are semi-starved. The main feed resources during the eight month long dry period are low-quality crop by-products like rice, wheat and millet straws. In the mountains, the transhumance system of animal keeping is predominant, in which people move with their herds in a systematic cycle, i.e., migration to mid-hills during winter, and to alpine pastures during summer. In the hills, people adopt a semi-stationary type of livestock keeping. During summer, the herds move higher to the hills and during winter, they are kept in and around settlements. In the terai, livestock are stall-fed, and have access to limited grazing on the fallow land. This paper deals with the ruminants with reference to feed availability, feed and fodder requirements and patterns of utilisation.

331 Joshi, Y. R.; Sharma, A. R.; Mitchelhill, B. K. 1990. **Farm models as research domains: their use for focussing on and prioritising livestock research issues within a farming systems context.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 130-130p.

Keyword(s): *Agricultural research / Livestock / Farming systems*

Call No: 630.72636 GAL 45 **Lang:** En

This paper summarises the use of farm models for focusing on and prioritising livestock research issues within a farming systems context.

332 Karki, M. S. 1993. **Livestock development activities in Kanchanpur district[Nepal].** *Veterinary review* 8(1):23-25

Keyword(s): *Livestock management / Animal husbandry / Nepal, FWDR, Kanchanpur*

Call No: 636.05 VER **Lang:** En

Nearly 50 per cent of the total area of Kanchanpur district is covered by forests comprised mainly of Sal, Sishaw and Khair trees along with a variety of native fodder trees which gives this district considerable potential for livestock development. The local tribes, the Tharus, are mostly marginal farmers who keep limited livestock. This paper highlights the overall livestock development activities conducted in Kanchanpur district, and their progress. The need for making of surplus livestock products and establishing better correlation between the rate of production and market demand are also discussed.

333 Katuwal, S. 1990. **The role of women in livestock production.** (PAC technical paper, 126). Dhankuta: Pakhribas Agricultural Centre. 7p.

Keyword(s): *Livestock / Animal production / Women's participation / Nepal*

Call No: 630.72636 PAA 45 **Lang:** En

The paper identifies the importance of the role of women in livestock production. Proportional distribution of work by gender is given. On a daily basis, women's involvement in different activities is quantified. Important livestock related works, such as milking and fodder collection are analysed according to gender input from which women's involvement comes to 40 per cent and 50 per cent respectively. Women are concerned that they should not be

excluded in development activities. A number of topics have been suggested for which women farmers should be trained.

334 Kilduff, J.; Dutta, P.; Jansen, W. 1990. **Improving routine management of ruminant livestock.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 24-31p.

Keyword(s): *Ruminants / Livestock management*

Call No: 630.72636 GAL 45 **Lang:** En

Routines of livestock management currently practised in the eastern hills of Nepal are detailed in this paper, and suggestions are made as to how they can be improved to up-grade productive performance. The condition of large ruminants have been focussed, because there is more management input with these animals, most particularly, with lactating stock. Feeding systems, water provision, milking practice, manure storage, shifting stall management, dry season feeding, improvement of digestibility of roughages, and estrus recognition are discussed as they affect basic husbandry routines.

335 Kohli Jackle, M. 1983. **Tinau Watershed Project: final report livestock.** Kathmandu: Nepal. Ministry of Forests. Department of Soil Conservation and Watershed Management. 20p.

Keyword(s): *Pastures / Animal husbandry / Feed crops / Livestock management / Nepal, WDR, Palpa*

Call No: 333.7635076 KOT 1 **Lang:** En

336 Kshatri, B. B. 1992. **Trends in the sheep population in the hills of eastern Nepal.** *Veterinary review* 7(2):58-61

Keyword(s): *Sheep / Population growth / Animal husbandry / Nepal, EDR*

Call No: 636.05 VER **Lang:** En

The hills and mountains, of Nepal contains highest sheep population in Nepal. Sheep are unique among domestic livestock because they can be maintained under diverse environmental conditions. Sheep-rearing is an important subsidiary occupation of the rural people in the eastern hills and mountains of Nepal. This paper presents the overall view regarding

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the transhumant system of sheep production in Okhaldhunga district between 1979 and 1989. During a ten-year period the number of shepherds fell by 55 per cent and the number of sheep fell by 38 per cent as given in the paper. The reasons for the decline in the transhumant systems is discussed, and several recommendations are made.

337 Kshatri, B. B. 1990. **Trends in the sheep population of hills of Eastern Nepal.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 105-105p.

Keyword(s): *Livestock/Hills/ Sheep / Nepal, EDR*

Call No: 630.72636 GAL 45 **Lang:** En

This paper presents only the abstract of the paper, that highlights the trends in the sheep population of the hills of eastern Nepal.

338 Manzardo, A. E. 1984. **High altitude animal husbandry and the Thakalis of Thak khola: biology and trade in the Himalayas.** *Contributions to Nepalese studies* 11(3):21-35

Keyword(s): *Himalayas / Animal husbandry / Ethnic groups / Nepal, WDR*

Call No: 306 CON **Lang:** En

A successful system of animal husbandry is critical for maintaining a successful trading system in an area with poor transportation, such as the Himalayas. Thakalis are the main inhabitants of the Himalayan region of Thak Khola. Due to access to pack animals and plentiful pasture land, the Thakalis have an advantage over neighbouring groups in establishing themselves as the major trading groups in central Nepal. In this article the author has emphasised and discussed some of the biological and biosocial elements of the Thakalis' adaptation to life as traders due to economic and structural factors. Some special features of the Thakali high altitudinal husbandry have also been mentioned.

339 Moktan, D.; Mitchelhill, B. K.; Joshi, Y. R. 1990. **Village animal health workers in the Koshi hills.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 126-126p.

Keyword(s): *Animal health / Veterinary services / Nepal, EDR, Koshi*

Call No: 630.72636 GAL 45 **Lang:** En

Summary of the papers presented at the workshop briefs out the activities and their evaluation conducted by the village animal health workers in the Koshi hills.

340 Moktan, D.; Mitchelhill, B. K.; Joshi, Y. R. 1990. **Village animal health workers in the Koshi hills: an evaluation report.** (PAC working paper, 4). Dhankuta: Pakhribas Agricultural Centre. 65p.

Keyword(s): *Animal husbandry / Animal health / Hills / Nepal, EDR*

Call No: 630.72636 MOV 45 **Lang:** En

This document presents the evaluation report on village animal health workers in the Koshi hills, which covers the background, objectives, methods, results, and recommendations.

341 Morel, A. M.; Oli, K. P. (eds.) 1985 **Livestock in the hills of Nepal: proceedings of the First Livestock Workshop held on 5-7 Feb 1985 at Pakhribas Agricultural Centre, Dhankuta, Nepal.** Dhankuta: Pakhribas Agricultural Centre. 172p.

Keyword(s): *Livestock / Animal production / Hills / Animal breeding / Nepal*

Call No: 630.72636 MOL 45 **Lang:** En

The proceedings includes the discussion papers presented at the workshop and the topics covered are comprehensive. Eleven papers have been included under four broad heading: animal husbandry, animal disease, animal nutrition and livestock marketing. Papers presented on draught animals, assessment of fodder resources in the hills, livestock production and disease problems, especially fascioliasis in eastern hills of Nepal are of special interest as they focus on the problems of livestock development in the hills. It also includes the recommendation passed at the workshop.

342 Munankami, R. B. 1989. **An analysis of selling of ruminant animals in Kathmandu during Desain and Tihar festivals.** Kathmandu: No-Frills Consultants. 16p.

Keyword(s): *Livestock management / Market studies / Ruminants / Nepal, CDR, Kathmandu*

Call No: 381.4136 MUA P **Lang:** En

Desain and Tihar are the main festivals in Nepal when a large number of ruminant animals are in

demand both for meat and sacrificial purposes. This demand is highly discernable in the urban areas especially in Kathmandu. The present document, focusses on the magnitude of the supply and demand, their marketing cost, selling price, the sources of supply, the nature of the seller, and finally studies its implications.

343 Nepal. Ministry of Agriculture. National Agricultural Research and Services Centre. 1989. **Lampatan Livestock Research Station: progress report 1988/89.** Kathmandu: Nepal. Ministry of Agriculture. National Agricultural Research and Services Centre. 400p.

Keyword(s): *Animal husbandry / Livestock / Progress reports / Nepal, WDR, Kaski*

Call No: 636 NEP

Lang: En

This volume presents the annual progress report for 'Livestock Research Station Lampatan'. The report is presented in twelve chapters including the Annex. The general description of the station with information regarding its ecological features and natural resources, description on technology, its contribution, target, achievements and overall cost/benefit ratio of the station is provided in the first chapter. Research and outreach activities, production, distribution and general description on pasture and forage section is presented in the second chapter. Research and outreach activities, production, distribution and general description on sheep, buffalo, poultry, and pig are presented in the third, fourth, fifth, and sixth chapter. In Chapter Seven general description and research activities for dispensary are presented. Publication and extra technical activities by the technicians of the station during the fiscal year 1987/88 is given in Chapter Eight. Evaluation of job performances of the staffs at the station, visitors' reports and directives are given in chapters nine, ten, and eleven.

344 Nepal. Ministry of Agriculture. Women Farmer Development Division. 1993. **Women farmers in livestock production programme: a case study of selected districts.** Kathmandu: Nepal. Ministry of Agriculture. Women Farmer Development Division. 44p.

Keyword(s): *Livestock / Women workers / Women's participation / Nepal*

Call No: 305.4 WOF P

Lang: En

For years, despite their substantial contribution, women have remained 'invisible' in the agricultural scene. As a result, agricultural and rural development plans and policies have tended to bypass them and efforts in improving rural living conditions and agricultural productivity. Therefore, women, have remained less than effective. Though recently the

important role of women in the agricultural sector has been recognised, but lack of adequate and reliable data about their role and contribution through various agricultural activities in the rural areas has constrained the formulation of appropriate strategies to promote gender-focussed programmes in the ministry. This report highlights the insight level of participation of the Nepalese women farmers in livestock production. Use of women labour in feeding management followed by fodder collection and animal shed management is reported to be the highest. Based on the findings of the study, it is recommended that development programmes should be gender-specific and woman farmers should be empowered so that they can be actively involved in socioeconomic activities, which need to be changed in the existing system of transfer of technology. In the case of livestock, it is suggested, that such changes should be based on detail study identifying the interest, priorities, and the technical needs of the women farmers.

345 Nepal. Ministry of Forests. Department of Soil Conservation and Watershed Management. 1983. **Tinau Watershed Project: livestock section.** Kathmandu: Nepal. Ministry of Forests. Department of Soil Conservation and Watershed Management. 8p.

Keyword(s): *Livestock management / Nepal, WDR, Palpa*

Call No: 333.716635 TIW 1

Lang: En

Report on the evaluation of faecal samples collected from healthy adult water buffaloes and cattle in the two panchayats of Madan Phokara and Humin in the area of the Tinau Watershed Project are presented in this paper.

346 Nepal. Ministry of Panchayat and Local Development. Rasuwa/Nuwakot Rural Development Project. 1979. **Marketing survey of farm produce, livestock, cloth and storage needs in Rasuwa/Nuwakot District.** Kathmandu: Nepal. Ministry of Panchayat and Local Development. Rasuwa/Nuwakot Rural Development Project. 116p.

Keyword(s): *Animal products / Market studies / Employment / Dairy products / Development projects / Nepal, CDR, Nuwakot / Nepal, CDR, Rasuwa*

Call No: 307.72635 RAN 3

Lang: En

This document deals with internal and external marketing of farm produce, livestock, cloth and storage needs based on the marketing survey done at Rasuwa, Nuwakot District. Recommendations and the

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format of the survey have also been included with brief information on general topics. Data on all above items are presented in tabulated form.

347 Nepal. Ministry of Panchayat and Local Development. 1978. **Rasuwa/Nuwakot Rural Development Project: milk production survey, Trisuli area.** Kathmandu: Nepal. Ministry of Panchayat and Local Development. 8p.

Keyword(s): Livestock / Milk products / Dairy products / Nepal, CDR, Nuwakot / Nepal, CDR, Rasuwa

Call No: 307.726371 RAN 3 **Lang:** En

The Dairy Development Corporation with a socioeconomic unit carried out a milk production survey of the Trisuli area. This report is given in this document.

348 Nepal. Ministry of Panchayat and Local Development. **Rasuwa/Nuwakot Rural Development Project: milk production survey-Yarsa, Dhaibung and Bhorle Panchayats.** Kathmandu: Nepal. Ministry of Panchayat and Local Development. 12p.

Keyword(s): Livestock / Development projects / Dairy products / Animal products / Nepal, CDR, Nuwakot / Nepal, CDR, Rasuwa

Call No: 307.726371 RAN 3 **Lang:** En

The Dairy Development Corporation with a socioeconomic unit carried out a milk production survey of Yarsa, Dhaibunj and Bhorle. The report is given in this document.

349 Oli, K. P. 1984. **Farming system a vital issue for livestock development.** ? 5p.

Keyword(s): Farming systems / Livestock management / Hills / Nepal

Call No: 636 OLF F **Lang:** En

Livestock enterprises are largely influenced by the existing family systems in the hills. Almost all power, fertilizer and animal protein is supplied by the animals. The degree varies depending on farm size, access to inputs' incentives to the workers and farmers, ethnic group distribution and environmental and managerial factors. This paper presents a brief overview on a wide range of farming systems, which play a vital role in livestock development.

350 Oli, K. P. 1989. **Research needs in crop-livestock interactions.** In Yazman, J. A.; Oli, K. P. Proceedings of the Workshop on Research

Needs in Livestock Production and Animal Health in Nepal held on 1-7 Jan 1989 at Kathmandu. Lalitpur: Nepal. National Agricultural Research and Services Centre. Central Livestock Development Centre. 54-58p.

Keyword(s): Farming systems / Crop protection / Livestock management / Nepal

Call No: 636 YAP **Lang:** En

Crop-livestock interaction studies in Nepal have been very limited. However, the majority of work has emphasised increased crop productivity due to the need to increase food grain production. Due to various reasons, insufficient attention has been paid to important crop-livestock interactions. Nepal's small farmers are ethnically diverse, are distributed across several agro-ecological zones, and have very complex farming systems. On-farm research activities is the most efficient way to develop new technology for the small farm. Only through multi-disciplinary research, which considers the complex relationships between the crop and livestock subsystems, will technologies that are appropriate and should be adopted by small farmers be identified. This paper deals with the crop-livestock research strategies required for the development of appropriate technologies for Nepalese small farmers.

351 Oli, K. P. 1986. **Work of the Livestock Section, Pakhribas Agricultural Centre.** In Robinson, P. J. Proceedings of the first Meeting of the Working Group on Fodder Trees, Forest Fodder and Leaf Litter held on 23 Jun 1986 at Kathmandu, Nepal. (FRIC occasional paper, 3/87). Kathmandu: Nepal. Department of Forest. Forest Research and Information Centre. 4-4p.

Keyword(s): Feed crops / Institutional framework / Nepal, EDR, Dhankuta

Call No: 636.08551 ROP P **Lang:** En

This note covers one particular experiment on tree fodder feeding practices carried out in 1985 in the local target area of Pakhribas Agricultural Centre.

352 Osullivan, G. 1980. **Tinau Watershed Project: livestock extension programme.** Kathmandu: Nepal. Ministry of Forests. Department of Soil Conservation and Watershed Management. 60p.

Keyword(s): Animal husbandry / Livestock management / Watershed management / Nepal, WDR, Palpa

Call No: 333.7161 TIW 1 **Lang:** En

353 Panday, K. K. 1991. A simple case of livestock management by the Bhardeo community. In Shah, P. B.; Schreier, H.; Brown, S. J. Soil fertility and erosion issues in middle mountains of Nepal: Workshop proceedings on Jhikhu Khola Watershed held on 22-25 Apr 1991 at Dhulikhel, Nepal. Kathmandu: Nepal. Topographical Survey Branch. Integrated Survey Section / Vancouver, BC: University of British Columbia. Dep. of Soil Science. 47-50p.

Keyword(s): Livestock management / Community development / Nepal

Call No: 631.4 SHS

Lang: En

People in the mountains try to minimise risks, by avoiding lactation when fodder availability is low and when milk conservation and milk product marketing is difficult. This paper attempts to highlight the indigenous techniques used in the management of natural resources such as livestock by a mountain community. The limitations included are high rate of deforestation, food deficit for over six months a year, damaged farming infrastructures such as terraces and irrigation systems, and most adult males being absent from the area over the dry period in search of incomes. The example quoted in this paper, is a simple case study of livestock management by the Bhardeo community located in the centre of Lalitpur district.

354 Pant, T. N. 1981. Seminar on Farm Resource Allocation for Efficient Crop and Livestock Systems in Nepal held on 28-30 Jan 1979 at Kathmandu, Nepal. In Pant, T. N. Seminar reports on Water Management and Control at the Farm Level held on 25-27 Oct 1978 at Kathmandu, Nepal. Kathmandu: Nepal. Ministry of Agriculture. 51-87p.

Keyword(s): Farming systems / Cropping patterns / Small-scale farming / Crop yield / Livestock / Nepal

Call No: 630.7 PAS

Lang: En

This seminar report includes seven papers presented at the seminar on 'Farm resources allocation for efficient crop and livestock system in Nepal'. The papers are on: farm systems and national development policies; studies on cropping systems in Nepal; farming systems in Nepal; small farmers, input supply, and integrated crop and livestock system; integration of crop and livestock system in Nepal; improving crop and livestock systems on small farms in Nepal; and research needs in integrated crop and livestock farming system in Nepal. A summary of the seminar is also provided at the end.

355 Paudyal, D. 1980. The potential of cropping systems research innovations in crop - livestock based farming systems in the hills of Kaski district, Nepal. Los Banos: University of Philippines. 185p.

Keyword(s): Farming systems / Agricultural research / Livestock management / Cropping systems / Nepal, WDR, Kaski

Call No: R 338.16 PAP

Lang: En

This thesis presents the results of the study carried out to examine the relevance of promising cropping pattern innovations within a whole farm framework with the main consideration for linkages involved in the crop-livestock based farming system. Background agricultural information, general comparison between geographical regions, hill agricultural development efforts as well as the objectives and hypothesis of the study are discussed in the introductory chapter. Chapter Two contains a brief discussion of the literature related to the analysis of the crop-livestock based farming systems. The third chapter describes the agroclimatology of the study area together with the farm resource base and principle features of the existing farming systems, existing and potential cropping patterns, as well as livestock development potential in relation to market, resources, feeds and fodder. The fourth chapter provides the conceptual framework, methodology, programming models, sources of data, resources and the types of farms studied. In Chapter Five analysis of the existing and optimal farm plans and the sensitivity analysis with respect to the criteria stated above in the objectives and hypothesis are included. Finally, in the last chapter, the summary, conclusion, and economic implications of the study are presented.

356 Pearson, R. A. 1990. A comparison of the work performance of Jersey crossbred and local oxen in the Koshi hills of east Nepal. (PAC technical paper, 130). Dhankuta: Pakhribas Agricultural Centre. 27p.

Keyword(s): Animal husbandry / Cross breeding / Hills / Nepal, EDR

Call No: 630.726362 PEC 45

Lang: En

In the eastern hills, the majority of male cattle are castrated and kept on farms for work. Apart from hand labour, these are the only means the farmer has for cultivating his land. They also provide manure which is valued as a fertilizer. But to obtain sufficient milk, Jersey bulls have been imported to cross with the local hill cows. This paper presents the report on the comparison of the work performance of Jersey crossbred and local oxen in the Koshi hills of eastern Nepal. Food intake and digestibility of feed have also been compared apart from work performance.

357 Pearson, R. A.; Lawrence, P. R. 1990. **Some observations on work output and feeding of draught animals in the Koshi Hills of Nepal.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 32-41p.

Keyword(s): *Draught animals / Animal feeding / Hills / Nepal, EDR, Koshi*

Call No: 630.72636 GAL 45

Lang: En

Research on draught animals has been based at the Centre for Tropical Veterinary Medicine in Edinburgh and funded by the Overseas Development Administration for over 10 years. The aim is to provide guidelines to help people decide on the type and number of draught animals which are best suited to their particular needs, and the most appropriate way of feeding and working them, given the available resources. Similar kinds of studies were carried out at Pakhribas and also for a short period at Tarahara, the objectives being, to look at the variation in work output between draught animal teams under similar conditions and to identify the main factors responsible for the variation. The results of the studies relevant to draught animals in the hills are also summarised.

358 Poudel, D. 1990. **Saanen goats as a possible income generator for small farmers in Nepal.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 16-23p.

Keyword(s): *Animal husbandry / Income / Small-scale farming / Nepal*

Call No: 630.72636 GAL 45

Lang: En

Goats are mostly kept by small farmers as an income generator. The demand for goat meat is high and always rising. There is however, no specific meat breed in Nepal. This paper summarises the information collected so far on age at first kidding, kidding interval, litter size, survival rate of kids to weaning, birth weight and weaning weight based on the breeding programme, which compares meat productivity of Saanens and their crossbreeds with local hill goats.

359 Rai, U. P.; Joshi, Y. R.; Sharma, A. R. 1990. **Long-term trends in market prices:**

implications for livestock research and development. In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 101-101p.

Keyword(s): *Livestock management / Agricultural markets / Agricultural research*

Call No: 630.72636 GAL 45

Lang: En

The abstract for the paper on long-term trends in market prices: implications for livestock research and development, focusses on the increase in the production levels of livestock that might benefit the smaller farmers.

360 Rajbhandary, H. B.; Pradhan, S. M. S. 1981. **Appropriate technology for livestock development to hill farming systems.** In Nepal. Ministry of Agriculture. Department of Agriculture / Agricultural Development Council. Seminar on Appropriate Technology for Hill Farming Systems held on 22-26 Jun 1981 at Kathmandu. Kathmandu: Nepal. Ministry of Agriculture. Department of Agriculture / Kathmandu: Agricultural Development Council. 258-296p.

Keyword(s): *Farming systems / Hills / Livestock / Appropriate technology / Nepal*

Call No: 631.09143 DES

Lang: En

The hard pressing need of present day Nepalese agriculture is to find out the appropriate technology for increasing production through the study of hill farming system. Cropping system constitutes only a part of this farming system. This paper intends to assemble the relevant scattered observations made by the authors from time to time to give information regarding appropriate technology for livestock development to the hill farming systems of the area, where the core of the subsistence economy is the integration of crop and livestock production. The authors further attempt to assess the magnitude of the problem in transferring the appropriate technology of the government livestock farms to the farming systems of the hills.

361 Rajbhandary, H. B.; Pradhan, S. L. 1991. **Livestock development and pasture management.** In World Conservation Union (IUCN) Nepal. Background papers to the national conservation strategies for Nepal. Kathmandu: World Conservation Union (IUCN) Nepal. V.1(259-331)p.

Keyword(s): *Livestock management / Pasture management / Nepal*

Call No: 333.715 WOB

Lang: En

This paper discusses the livestock development in terms of national economy and pasture management to support livestock development. The general description discusses the major programme of livestock development and pasture management and their importance in the objectives of the National Conservation Strategy (NCS). Major obstacles, conservation/ development interaction for the livestock development and pasture management is also discussed. Improved agropastoral practices and forest grazing is highlighted. Range management and massive fodder tree plantation in the hills and its effect in the livestock improvement is also discussed. Finally, the paper provides the priority required of livestock development and pasture management based on the NCS and pilot programme on livestock development and pasture management.

362 Robinson, P. 1993. **Indigenous knowledge in yak/cattle cross-breeding and management in high altitude Nepal.** In Tamang, D.; Gill, G. J.; Thapa, G. B. (eds.) *Indigenous management of natural resources in Nepal: proceedings of the Workshop on Indigenous Management of Agriculture held on 8-9 Jun 1992 at Dhulikhel, Nepal.* Kathmandu: Winrock International Inst. for Agricultural Development. 239-248p.

Keyword(s): *Animal breeding / Animal production / Animal husbandry / Traditional technology / Yaks / Nepal*

Call No: 333.7 TAI

Lang: En

The indigenous knowledge in yak/cattle cross breeding type and its management in the high altitude of Nepal, with broad characteristics and occurrences of livestock types is discussed and described in this paper.

363 Robinson, P. J. 1990. **Trends in livestock numbers and fodder and tree resources in Dolakha district.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 104-104p.

Keyword(s): *Livestock / Feed crops / Nepal, CDR, Dolakha*

Call No: 630.72636 GAL 45

Lang: En

The abstract focuses on the aspects of the livestock and cropping system management which contribute to differences in the dynamics of private tree resources.

364 Salman, A. A. 1977. **Feasibility study for an integrated dairy project in outer Kathmandu valley, Kingdom of Nepal.** Kuwait: Kuwait Dairy Company. 28p.

Keyword(s): *Animal husbandry / Dairy industry / Feasibility studies / Nepal*

Call No: 637 SAF P

Lang: En

The main objectives of this study, which aims at formulating an integrated dairy project in the outer Kathmandu Valley, is to produce in short, four million litres of milk for its population. This report describes the project along with a comprehensive technical, financial and economic analysis of the project.

365 Sapkota, M. R. 1991. **Cheese production in Nepal: lessons from the past, lessons for the future.** (Research report, 13). Kathmandu: Winrock International Inst. for Agricultural Development. 71p.

Keyword(s): *Animal products / Dairy products / Nepal*

Call No: 637.3 SAC

Lang: En

This paper describes the growth of the cheese industry in Nepal from its inception to the present day with a view to uncover the keys to its relatively high degree of success and assess its present situation and future prospects. Statistical analysis on cheese production is discussed to identify trends over time in such variables as: levels of output, prices, cost of production, composition of output, profitability and public/private participation in cheese production. Factors which led to the establishment and subsequent development of cheese production in the country are examined and considered as lessons that might be learnt for other agricultural sub-sectors and for other agro-based industries. The document also briefly introduces the cheese makers in both the public and private sectors. Marketing of cheese and its storage process and an assessment of existing demand for cheese in the Kathmandu and Pokhara valleys where a substantial proportion of cheese is consumed, are described. Finally, in the concluding chapter the role played by different participants in the development of the cheese industry is described. Existing problems and future prospects of cheese making are also included.

366 Sedhain, D. 1993. **A study of the transhumance system of management of**

sheep in Rasuwa and Nuwakot districts [Nepal]. In Tamang, D.; Gill, G. J.; Thapa, G. B. (eds.) *Indigenous management of natural resources in Nepal: proceedings of the Workshop on Indigenous Management of Agriculture and Natural Resources*, held on 8-9 Jun 1992 at Dhulikhel, Nepal. Kathmandu: Winrock International Inst. for Agricultural Development. 278-289p.

Keyword(s): *Animal husbandry / Transhumance / Traditional technology / Nepal, CDR, Nuwakot*

Call No: 333.7 TAI

Lang: En

Sheep-rearing is an important means of livelihood among the rural poor of Rasuwa and Nuwakot District. This paper discusses the traditional systems of sheep management and evaluates the production and management systems regarding its feeding practices, protections and shelter, diseases, pests, and poisoning. Finally, brief recommendations to improve the future status of sheep are given.

367 Sharma, R. P. 1982. *Invest in livestock in Nepal*. In Time, J. E.; Lattimore, R. G. (eds.) *Livestock in Asia: issues and policies*. Ottawa, Ont: International Development Research Centre. 60-64p.

Keyword(s): *Livestock / Investments / Nepal*

Call No: 636 FIL

Lang: En

This paper describes the inter-relationships between livestock and other components, which form the Nepalese farming system, and indicate the flow of specific resources from and to the livestock component. It also identifies the factors that influence the decision of Nepalese farm households to invest in livestock in relation to total livestock units and compositional structure of the total livestock population. Area for research on livestock economics is also suggested. The paper is based on secondary sources of information and includes six studies covering nine locations.

368 Shrestha, N. P. 1990. *Experiences of Pakhribas Agricultural Centre in livestock improvement in the hills of Eastern Nepal*. In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal*. Dhankuta: Pakhribas Agricultural Centre. 124-124p.

Keyword(s): *Agricultural research / Livestock / Genetic improvement/Hills/ Nepal, EDR, Koshi*

Call No: 630.72636 GAL 45

Lang: En

This paper presents only the abstract of the paper which briefly describes the experience of Pakhribas Agricultural Centre in livestock production in the eastern hills of Nepal with its potential improvement particularly in that area.

369 Shrestha, N. P. [1988]. *Livestock production and marketing needs of the farmers*. In Nepal. Ministry of Agriculture. Department of Food and Agriculture Marketing Services. *Proceeding of Small Farmer Marketing Extension Training Workshop held on 8-10 Sep 1987 at Pokhara, Nepal*. Kathmandu: Nepal. Ministry of Agriculture. Department of Food and Agriculture Marketing Services. 50-68p.

Keyword(s): *Animal products / Livestock / Marketing*

Call No: 658.80963 FOP

Lang: En

Ninety-one per cent of the Nepalese people obtain their livelihoods from agricultural sector and most of them in the rural areas maintain some livestock. This paper discusses the role of farmers in livestock production and the importance of marketing required to fulfil the needs of the farmers. Problems and constraints of livestock management and suggestion of the improvement of marketing are also listed out.

370 Shrestha, N. P.; Sherchand, L. 1988. *Role of livestock in Nepalese farming system*. Helsinki: World Association for Animal Production. 81p.

Keyword(s): *Livestock / Farming systems / Nepal*

Call No: 636 SHR

Lang: En

Agriculture in Nepal is a mixed farming system, the integration of the crops with livestock, forestry and marketing is an old practice of Nepalese farmers. All the cultivated land of the higher hills, and mid hills are ploughed by animal power. The animal power of Nepal is being used for transportation, land preparation, threshing and harvesting of crops. This documents highlights the role of livestock in the Nepalese farming system with special reference to gross agriculture and livestock contribution. To raise the livestock production, animal feed resources, improved breed introduction and animal health improvement have been given greater emphasis. System of animal rearing, constraints of livestock development and recommendation for its development for the future are also provided.

371 Shrestha, R. L. J. 1982. **The relationship between the forest and the farming system in Chautara, Nepal with special reference to livestock production.** Canberra, ACT: Australian National Univ. 106p.

Keyword(s): *Farming systems / Forest management / Livestock management / Nepal*

Call No: R 636 SHR

Lang: En

Livestock raising is an important activity in the hill farming systems of Nepal. The high dependency of farmers on the forest, for raising livestock and meeting domestic needs, is considered to be one of the major reasons for deforestation and soil erosion. The relationship between the forest and the farming system in Chautara, Nepal, with special reference to livestock production has been focused in this thesis. In this context, an attempt has been made to discover the reasons why the Nepalese farmers attach with great importance to livestock. This involves examining the role of livestock in the farming system. The interaction of the farming system with the forest then is examined to discover the contributions made by the rural people significantly to deforestation. Data provided in the thesis show that households spend a considerable portion of their time looking after livestock. The data also reveal that families depend heavily on the forest, but collect greater quantities of fodder for their animals than firewood. Policies to alleviate the problems are suggested, which involves trying either to reduce animal numbers or to provide more fodder. This possibility is examined in the second part of the thesis. For this, regression analysis is conducted in order to determine the effect on livestock units of the number of privately owned fodder trees and the time taken by a family member to collect a load of fodder, factors likely to be affected by reforestation.

372 Singh, D. B. 1983. **Annual report of Pansayakhola Sheep Farm: 1982-83.** Kathmandu: Nepal. Ministry of Agriculture. Department of Livestock Development and Animal Health. 54p.

Keyword(s): *Sheep / Animal production / Nepal, CDR, Nuwakot*

Call No: 636.3 SIA

Lang: Ne/En

This documents present the annual report of Pansayakhola sheep farm, which illustrates its results for breeding and production for sheep in various tables and graphs.

373 Starkey, P. H.; Aperofia, K. V. 1986. **Integrated livestock systems in Nepal and Indonesia: implications for animal traction programme in west Africa.** (FSSP network

report, 3). Florida, FL: Farming System Support Project. Univ. of Florida. 64p.

Keyword(s): *Livestock / Farming systems / Animal products / Nepal / Africa / Indonesia*

Call No: 636 STI

Lang: En

Integrated livestock systems in Nepal and Indonesia with references to animal traction is highlighted in this report. Animal traction is commonly used in both Nepal and Indonesia, even in areas of steep, terraced hillsides and high population densities. The report is solely based on the authors participation in the Second Crop-Livestock Systems Research and Monitoring Tour of Nepal and Indonesia. First, crop-livestock systems in Nepal and Indonesia are described followed by the information on technical lessons learned from the tour. Discussions during plenary sessions and field visits are highlighted as important multi-disciplinary approach to research. Finally, animal traction networking activities in Africa and Asia is illustrated and recommended that further exchanges between the Asian Rice Farming Systems Network and the West African Integrated Livestock Systems Network be undertaken. Some background information of these organisation is also provided in this report.

374 Stoufer, K.; Ojha, N. 1993. **An animal health programme in Nepal.** *Appropriate technology* 19(4):13-15

Keyword(s): *Animal health / Animal husbandry / Nepal*

Call No: 604 P

Lang: En

Formal training courses in animal health have been running continuously since 1981 by staff of both expatriate and Nepali animal husbandry specialists, veterinarians, livestock educators and animal health technicians. Training methods and course content have continued to evolve over the years in response to trainee requests, the growth of development work in Nepal, and programme experience. The components of the basic and refreshers courses for a new training programme run to help the villagers to meet their needs in Nepal is explained in this paper. Additionally, the plan for its future regarding the training courses is also briefly discussed.

375 Trapp, H. **Assessment of the livestock carrying capacity and development strategy (Kabhrepalanchowk district).** In International Centre for Integrated Mountain Development. Applications of GIS to rural development planning in Nepal. (MENRIS [Mountain Environment and Natural Resources' Information System] case study, 2). Kathmandu: International Centre for Integrated

Mountain Development. 1-18p.

Keyword(s): *Geographical information systems / Livestock management / Carrying capacity / Development strategy*

Call No: 621.3679 INA

Lang: En

This paper focusses on the livestock and feed situation in the middle mountain regions of Nepal in Kabhrepalanchok district. The problem areas of specific terrestrial units is highlighted. An overview on population, natural resources and infrastructure of the district is presented along with the situation of feed supply, feed requirements, and livestock carrying capacity.

376 Tulachan, P. M. 1985. **Socio-economic characteristics of livestock raising in Nepal.** (Research report, 1). Morilton, AR: Winrock International Institute for Agricultural Development. 27p.

Keyword(s): *Livestock / Economic aspects / Nepal*

Call No: 636 TUS P

Lang: En

This paper attempts to describe existing village livestock production systems, emphasising the socioeconomic aspects affecting livestock holdings and shows how livestock production is related to other farming tasks. The paper also describes the links between crop and livestock production systems and determines the importance of livestock to farmers incomes. Costs and returns of livestock production systems is analysed and socioeconomic and institutional constraints to increase village livestock production is assessed. Finally, policy recommendations are listed.

377 Upadhyay, R. M. 1982. **Livestock development projects: the Nepalese experience.** In Time, J. E.; Lattimore, R. G. (eds.) *Livestock in Asia: issues and policies.* Ottawa, Ont: International Development Research Centre. 157-160p.

Keyword(s): *Livestock / Animal products / Nepal*

Call No: 636 FIL

Lang: En

Nepal has one of the highest livestock populations per household in the developing countries of the world. The productivity of livestock, however, is very poor because of poor nutrition, inadequate health services, poor genetic potential, inadequate extension services, and the lack of proper marketing channels. The Department of Livestock Development and Animal Health is the main institution responsible for livestock development, and the Dairy Development Corporation is responsible for collecting, processing,

and marketing milk and milk products. The main objectives of livestock development projects in Nepal are to improve animal health and production to increase rural income and employment, improve human nutrition, and reduce imports. The main strategy for livestock development is to encourage better utilisation of existing and improved feed resources, improve genetic makeup of livestock, provide better animal health services, and provide better marketing channels. This paper focusses on long-term policies, labour training programmes along with livestock production constraints, national livestock development plans and factors affecting returns from livestock development projects.

378 Wyatt-Smith, J. 1982. **The agricultural system in the hill of Nepal: the ratio of agricultural to forest land and the problem of animal fodder.** (APROSC Occasional Paper, 1). Kathmandu: Agricultural Projects Services Centre. 17p.

Keyword(s): *Hills / Feed crops / Land use / Farming systems / Nepal*

Call No: 630 WYA P

Lang: En

The problem of environmental degradation in the hills of Nepal are discussed briefly. They are attributed to the adoption of a single sectoral approach. There is a lack of attention being paid to the agricultural system as a whole and to the relationship between farm holdings and neighbouring forest land. The latter is essential both for conservation and for provision of such essential farm products as fodder, fuel, and timber. The relationship of agricultural land to forest land in the mixed farming system of the hills is quantified by area. The ratio given in this paper is approximately 1:2.8, 1:0.24 to 0.48 and 1:0.32 respectively for fodder, fuel and timber in the area of Pokhara and Tansen under the present very low level of management.

379 Yadav, Y. 1992. **Farming-forestry-livestock linkages: a component of mountain farmers' strategies (Nepal).** In Jodha, J. S.; Banskota, M.; Partap, T. (eds.) *Sustainable mountain agriculture.* Kathmandu: International Centre for Integrated Mountain Development. v.1(141-161)p.

Keyword(s): *Agricultural development / Forestry / Development strategy / Livestock / Nepal*

Call No: 630 JOS

Lang: En

Mountain farming systems have acquired a number of features to manage problems and opportunities created by mountain characteristics such as inaccessibility, fragility, and diversity. These farming

systems are highly labour-intensive and depend to a large extent on the available forests and rangelands. Forests on the other hand are as integral a part of the farming system as arable land and livestock. Thus, crop production, animal husbandry and forestry constitute the three main closely and inseparably integrated components of the mountain farming system. Furthermore, these linkages manifest the nature and degree of regenerative processes that are central to the sustainability of farming systems in the mountains. This paper presents some of the findings of that study. The paper introduces the study areas and focusses on their physical, socioeconomic, and agricultural characteristics as a background to understanding the strength and weaknesses of the linkages. This is followed by a discussion on the linkages among the various components of mountain farming systems and then by some important policy implications based on the findings of the study.

380 Yazman, J. A.; Oli, K. P. 1990. **Improvement of livestock production in Nepal through animal breeding.** In Gatenby, R. N.; Thapa, B.; Shrestha, N. P. (eds.) *Livestock in the hills of Nepal-2: proceedings of the Second Livestock Workshop held on 11-16 Mar 1990 at Pakhribas Agricultural Centre, Dhankuta, Nepal.* Dhankuta: Pakhribas Agricultural Centre. 1-15p.

Keyword(s): *Animal breeding / Animal production / Genetic improvement / Nepal*

Call No: 630.72636 GAL 45 **Lang:** En

Breed improvement in Nepal, where small farmers and herders have multiple objectives in keeping livestock, is a more complex process than in developed countries where livestock are selected for their efficiency in producing single products. Achievement of success in breed improvement programmes in Nepal, therefore, requires socioeconomic and marketing studies to be carried out in initial stages long before exotic breeds are imported and crossbreeds are distributed to farmers. This paper examines current programmes to improve livestock production through breeding in Nepal, including the substantial efforts by His Majesty's Government (HMG) to provide improved livestock for farmers through importation of exotic breeds, crossbreeding and artificial insemination. A National Livestock Breed Improvement Programme (NLBIP) is proposed to link together farmers and HMG agencies. The mandate of the NLBIP is reported to develop livestock breeds which are appropriate to the objectives and resources of Nepalese farmers.

381 Yazman, J. A.; Oli, K. P. (eds.) 1989 **Proceedings of the Workshop on Research**

Needs in Livestock Production and Animal Health in Nepal held on 1-7 Jan 1989 at Kathmandu. Lalitpur: Nepal. National Agricultural Research and Services Centre. Central Livestock Development Centre. 136p.

Keyword(s): *Livestock management / Animal health / Nepal*

Call No: 636 YAP

Lang: En

The proceedings illustrate the emphasis for livestock and animal health research, which should not only be on lab for the sake of the publication, but rather on adaptive research suggested for the real situation of livestock on small farms and in migratory herds and flocks. The volume includes 12 research papers presented at the workshop under four sections: animal breeding, animal nutrition, pasture and fodder, and animal health. Reports of the working groups on these four topics have also been provided in this proceedings.

Pakistan

382 Begum Sajida Nayyar Abidi. 1988. **Women in livestock management in Punjab [Pakistan].** In Pakistan Agricultural Research Council. *Rural women in Pakistan farming systems research: proceedings of the Workshop on Role on Rural Women in Farming Systems Research, held on 12-14 Jan 1988 at Islamabad, Pakistan.* Islamabad: Pakistan Agricultural Research Council. 13-14p.

Keyword(s): *Livestock management / Women's participation / Women's role / Pakistan*

Call No: 305.42 PAR

Lang: En

Women play a significant role in crop production, livestock management, and poultry farming in spite of many religious and social barriers and constraints. These are in addition to their seasonal work, child-rearing, and household duties. The role of women in small-scale and family subsistence farming is featured in this summarised paper. Livestock rearing with suggestions about the introduction of appropriate interventions for women and by women in rural Punjab are given. Suggestions to improve the production-oriented development in livestock and poultry are also presented.

383 M. Y. Malik. 1988. **Feed availability, requirements for animals and current patterns of utilization in Pakistan.** In Devendra, C. (ed.) *Non-conventional Feed Resources and Fibrous Agriculture Residues: Strategies for Expanded*

Livestock Production, Management and Development

Utilization - proceedings of a Consultation held on 21-29 Mar 1988 at Hisar. Ottawa, Ont: International Development Research Centre / New Delhi: Indian Council of Agricultural Research. 158-170p.

Keyword(s): *Animal husbandry / Animal feeding / Feed crops / Pakistan*

Call No: 636.085 DEN

Lang: En

Livestock production in Pakistan depends heavily on traditional feeding methods. Due to an increasing human population, priority has been given to production of food grains and cash crops. Livestock frequently face a shortage of traditional forages and pastures. Under the circumstances, crop residues and agro-industrial by-products offer great potential for feeding livestock. Considering the feed resources available in the country, there exists an acute deficiency of nutrients. As a result, the productivity of livestock is not in accordance with their genetic potential. To overcome the feed deficit situation, efforts are necessary to increase forage supplies through the introduction of high-yielding varieties and increased application of fertilizers. This paper addresses the present main animal feed resource and current patterns of utilisation in Pakistan.

384 *Mohammad Amin; Mohammad Nishat.* 1980. **Economics of milk production in Karachi.** (AERC [Applied Economics Research Centre] discussion paper, 42). Karachi: University of Karachi. Applied Economics Research Centre. 48p.

Keyword(s): *Milk production / Dairy products / Pakistan*

Call No: 637.1 MOE P

Lang: En

This paper based on the economics of milk production in Karachi attempts to analyse the factors which influence milk yields and the cost of producing milk in the Landhi Cattle Colony. Both production and cost function are estimated with data collected from a sample of 114 herds from the cattle colony. The paper also seeks answers to a number of questions, such as how inputs are allocated to different levels of outputs, which factors determine levels of milk production, how milk production and cost functions vary by herd size, and the types of marketing channels which are used.

385 *Pakistan. Agricultural Census Organization.* 1989. **Pakistan census of livestock 1986.** Lahore: Pakistan. Agricultural Census Organization. 53p.

Keyword(s): *Livestock / Statistical data / Pakistan*

Call No: R 633.009549 AGP

Lang: En

This report presents the final results of 1986 Census of Livestock in Pakistan in three volumes. Volume 1 contains tabulation at country and province levels, Volume 2 at province, division and district levels, whereas Volume 3 presents data on milk production and number of animals slaughtered. Preceding the statistical tabulations, there is a brief introduction to geographic coverage, scope, reference period, sampling plan and operational procedures followed by main findings and concepts and definitions of terms used in the tabulations. The introductory part also include a write up on quality of census data and extent of sampling and non-sampling errors likely to be associated with the data on important items.

386 *Rafiq H. Usmani.* 1994. **Possible applications of biotechnology to increase livestock productivity in Pakistan.** *Asian livestock* 19(1):8-11

Keyword(s): *Livestock management / Biotechnology / Technology transfer / Animal production / Pakistan*

Call No: 636 ASL

Lang: En

One of the greatest challenges for livestock sector of Pakistan is to meet the growing demand for animal and poultry products. This situation calls an impressive increase in domestic livestock production. Animal biotechnology holds several promises to achieve different targets for the livestock improvement. In this paper, possible application of biotechnology to increase livestock productivity in Pakistan through genetic improvement, production in the field of efficiency improvement, production performances improvement, and effective and economical disease control have been briefly described.

Africa

387 *Dozowela, B. H.; Saleem, M. A.* **Agroforestry systems in Africa: role in livestock production and protection of the environment.**

Keyword(s): *Livestock production / Environmental protection / Agroforestry / Africa*

Call No: 634.9 COA

Lang: En

Agroforestry practices and systems for supporting pastoral and agropastoral livestock production in Africa range from the preservation of trees to more intensively planted and managed systems. In the extensive traditional practices of tree conservation,

use strategy is geared towards biomass maintenance rather than production. Certain native tree species are protected for their fodder value in grazing and croplands. A mixture of livestock, grazers and browsers make the best use of vegetation types and forms. This paper looks at agroforestry options (traditional pastoralist systems, extensive agropastoral systems, and intensive agropastoral systems) available to mixed crop-livestock smallholder farmers, especially with respect to sustaining crop yields and livestock production through animal traction for ploughing and the provision of manure. The paper also addresses issues of protecting the environment within the context of pastoralism and agropastoralism.

388 Goe, M. R.; Astatke, A. 1989. **Development of draught animal power systems in Ethiopia.** In Haffmann, D.; Nari, J.; Petheram, R. J. (eds.) *Draught animals in rural development: proceedings of an International Research Symposium held on 3-7 Jul 1989 at Cipanas, Indonesia.* Canberra, ACT: Australian Centre for International Agricultural Research. 69-77p.

Keyword(s): *Draught animals / Animal power / Animal husbandry / Ethiopia*

Call No: 307.72 HOD

Lang: En

Use of animal power in Ethiopia is mainly confined to primary and secondary tillage using a plough called *maresha* which is pulled by a pair of animals, usually oxen, under a ridge neck yoke. Efforts have also been made to use single animals and cows for traction and introduce alternative uses of animal power for transport, crop processing, land-shaping and water lifting. However, follow-up evaluation of such research outputs at the small holder level have been limited in scope. This paper reviews past animal traction research in Ethiopia, and discusses aspects of different technologies which could contribute to improved use of animal power systems within the country. For detail information on particular topics discussed, the reader has referred to those reports cited.

389 Hoste, C. H.; Chalon, E.; d'Ieteren, G. 1992. **Trypanotolerant livestock in west and central Africa.** (ILCA monograph, 2). Addis Ababa: International Livestock Centre for Africa. v.3(206)p.

Keyword(s): *Livestock management / Animal husbandry / Animal production / Africa*

Call No: 636 HOT

Lang: En

This edited volume is the continuation of Volumes 1 and 2 of the study on 'Trypanotolerant livestock in

west and central Africa'. This volume presents major results obtained since the publication of Volume 1 and 2 and updates national data on trypanotolerant cattle. Population analysis and their trends in between the two survey is provided in the first chapter of part one of this volume and research review activities is given in the second chapter, and the development activities in the third chapter. It also gives recent information available on the potential and utilisation of trypanotolerant livestock, which accounts for its title. Recent data and discussions for 18 study countries, as well as for Equatorial Guinea which was not covered in Volume 2 is presented in the second part. An additional section on major developments occurring during the study period has been included at the end of each country study. A selected bibliography for each country is included at the end of each country study. A general list of references for part 1 and 2 appears at the end of the document. The main comments and analysis are summarised in the conclusion.

390 Kerven, C. 1987. **Some research and development implications for pastoral dairy production in Africa.** ILCA bulletin (26):29-35

Keyword(s): *Animal products / Dairy industry / Livestock / Africa*

Call No: 636.05 ILB

Lang: En

This paper examines the relative merits of milk versus meat production by African pastoralists and concludes that development of the pastoral dairy sub-sector is warranted on the following grounds. While there is rarely a surplus of live animals in pastoral economies, pastoral herds may produce more milk during seasons of high milk production than can either be consumed in the household or exchanged at profit. The second argument in favour of developing pastoral dairying is that many pastoralists are already engaged in commercial exploitation of dairy produce, but are often constrained by lack of capital, inputs and, suitable processing techniques. Lastly, since extensive commercial meat production requires more land per animal unit to achieve economic and energy outputs comparable to those achieved by dairying, the latter can offer a high income to a greater number of people.

391 King, J. M.; McArthur, S. R.; Pike, D. J. 1988. **Studying husbandry and health of Awassi sheep in Bedouin flocks: evaluation of methodology using initial results.** In Thomson, E. F.; Thomson, F. S. *Increasing small ruminant productivity in semi-arid areas.* Dordrecht: Kluwer Academic Publishers. 199-212p.

Keyword(s): *Animal husbandry / Sheep*

Call No: 636.2 THI

Lang: En

The research strategy and methods devised to obtain information on the constraints to sheep production have been described in this paper. Some preliminary results used to evaluate the methodology regarding the health of Awassi sheep in Bedouin flocks are also presented.

392 Mbake, M. 1989. **Draught animal power in the Gambia.** In Haffmann, D.; Nari, J.; Petheram, R. J. (eds.) *Draught animals in rural development: proceedings of an International Research Symposium held on 3-7 Jul 1989 at Cipanas, Indonesia.* Canberra, ACT: Australian Centre for International Agricultural Research. 78-79p.

Keyword(s): *Draught animals / Animal power*

Call No: 307.72 HOD

Lang: En

A brief review of the developments and utilisation of animals for draught purposes in the Gambia and the subregion is presented in this paper. History of animal traction, its current situation, regional activities in draught animal power research, and the constraints along with recommendations have been reviewed. Draught animals are not used intensively, which could be attributed to a number of factors, such as animal trypanosomiasis, limited work force and financial resources and cultivation practices. Animals are used as a means of transportation in rural and some urban areas. Therefore, regional cooperation in the field of draught animal research is suggested if crop production is to be increased to meet the demands of an increasing population.

393 McCown, R. L.; Haaland, G.; DeHaan, C. 1979. **The interaction between cultivation and livestock production in semiarid Africa.** In Hall, A. E.; Cannell, G. H.; Lawton, H. W. (eds.) *Agriculture in semi-arid environments.* Berlin: Springer-Verlag. 297-332p.

Keyword(s): *Farming systems / Crop protection / Cultivation / Livestock*

Call No: 630.915 HAA

Lang: En

In this paper an attempt has been made to isolate the different types of relationship or linkage that characterise the interaction between cultivation and livestock production and to consider the conditions under which each linkage can be expected to occur. Eight cases from summer rainfall, semi-arid zones of Africa are described which demonstrates various configurations of linkage in existing production systems, together with the conditions under which they have developed. Finally, the trends in the form of linkages from an evolutionary standpoint are

considered. The paper on the whole presents, not the historical account, but rather it considers what forms are likely to emerge under different ecological, political, and economic conditions pertaining to future livestock-cultivation interaction.

394 Powell, J. M.; Williams, T. O. 1993. **Livestock, nutrient cycling and sustainable agriculture in the west African Sahel.** (IIED gatekeeper, 37). London: International Inst. for Environment and Development. 15p.

Keyword(s): *Livestock / Agricultural development / Nutrient content / Sahel*

Call No: 636 POL P

Lang: En

This paper addresses the issue of nutrient cycling by livestock in the West African Sahel. Its basic premise is that an efficient cycling of nutrients between soils, crops and livestock is vital to the sustained productivity of farming systems in the Sahel. It reviews traditional linkages between ruminant livestock (cattle, sheep and goats) and soil productivity, and assesses the adequacy of such practices in light of changes taking place in the region. It concludes by suggesting ways in which nutrient cycling could be improved and made part of a broader strategy to enhance sustainable crop-livestock production in the West African Sahel.

Asia

395 Agrawal, R. C. 1988. **Impact of cattle distribution from government livestock farms on smallholders in Sri Lanka.** Berlin: Technical University of Berlin. 172p.

Keyword(s): *Cattle / Small-scale farming / Animal husbandry / Sri Lanka*

Call No: 636 AGI

Lang: En

This report examines the impact of distribution of neat cattle and buffaloes from government livestock farms on small-scale milk producers in four agro-ecological zones, viz, Coconut Triangle, Dry zone, Mid-country, and Up-country of Sri Lanka. The constraints regarding livestock farming are discussed. The major findings and proposals deal with aspects of production including breeding, socioeconomy, target groups, distribution policy and channels and related services, such as the follow-up, especially with regard to animal health, artificial insemination services, extension and training, credit, milk collection, marketing and prices. The main focus is on neat dairy cattle. The results presented in this report are based on interviews with farmers and landless estate labours and visits to livestock farms.

396 Anderson, G. W.; Moore, R. W.; Jenkins, P. J. 1988. **The integration of pasture, livestock and widely spaced pine in South West, Western Australia.** *Agroforestry systems: an international journal* 6(3):195-211

Keyword(s): *Agricultural production / Pasture management / Livestock / Australia*

Call No: 634.9 AGS

Lang: En

This paper describes management procedures and incorporates biological and economic data, from a number of agro-silvo-pastoral trials in the southwest of western Australia. The integration of pine timber and livestock production is shown to have a range of economic and environmental benefits available in the long-term. Ways in which the choice of tree density, planting pattern, and silvicultural regime can each be directed towards the achievements of various objectives are also indicated. In general, this paper outlines methods of managing an agroforestry system, summaries data from trials in western Australia and presents the major findings of the economic analysis.

397 Copland, J. W.; Gleeson, L. J.; Chamnanpood, C. 1994. **Diagnosis and epidemiology of foot and mouth disease in Southeast Asia: proceedings of an International Workshop held from 6-9 Sep 1993, at Lampang, Thailand.** (ACIAR [Australian Centre for International Agricultural Research] proceedings, 51). Canberra, ACT: Australian Centre for International Agricultural Research. 209p.

Keyword(s): *Disease control / Vaccination / Viruses / Livestock management / Animal diseases*

Call No: 636.08944 COD

Lang: En

The proceeding include 20 research papers presented at the workshop under five broad heading. The first two papers deal with some of the broad issues that influence foot-and-mouth disease control programmes on a global basis placed under the heading: overview of global foot-and-mouth disease status and issues. The heading epidemiology of foot-and-mouth disease in Thailand includes six papers. The heading control of foot-and-mouth disease in southeast Asia includes five papers. The heading diagnosis of foot-and-mouth disease includes four papers. The heading information systems in disease control strategies includes six papers. Eleven country papers on diagnosis and epidemiology of foot-and-mouth disease in southeast Asia is also included in this publication. Finally, the recommendations suggested during the workshop have also been included.

398 Daniels, P. W.; Sudarisman Ronohardjo; Purnomo Ronohardjo. (ed.) 1988 **Malignant catarrhal fever in Asian livestock.** Canberra: Australian Centre for International Agricultural Research. 129p.

Keyword(s): *Livestock management / Animal diseases / Asia*

Call No: 636.089 DAM

Lang: En

This monograph presents the seminar proceedings and other contributions by the research project. It represents the first major study of malignant catarrhal fever (MCF) in Indonesia. In the first section, the directorate of animal health gives a concise overview of MCF in Indonesia. In the subsequent epidemiology section, the situation in certain areas is elaborated to illustrate various aspects of the disease, including epidemiological patterns that have been recognised. Each paper highlights some particular aspect or anomaly of the problem. Section Two discusses the consequent problems in differential diagnosis of the condition, and provides the framework on which to build a nationwide consensus among Indonesian veterinary diagnosticians on what should and should not be called MCF. Overviews of the current research of Indonesian and Australian scientists to define the etiology are comprised in section three. Additionally, recommendations on the task for the future are also provided.

399 Devendra, C. 1993. **Development of sustainable animal production in integrated small farm systems in Asia.** In *Asian Productivity Organisation. Sustainable agriculture development in Asia: proceedings of the report of an APO study meeting on Sustainable agriculture held on 23 Feb - 5 March 1993 in Tokyo, Japan.* Tokyo: Asian Productivity Organisation. 124-145p.

Keyword(s): *Animal production / Asia*

Call No: 630 ASS

Lang: En

Small farm systems constitute the backbone of Asian agriculture. They form the cradle of food production in the face of rapid population increase, continuing poverty in rural, and urban areas, and acute pressures on the natural resources base. The problems are especially complex and urgent in Asia. On the one hand, it concerns approaches and strategies that can be applied to improve livelihoods of human population and on the other, it encourages the use of technologies that can provide for increases in productivity and growth without damaging the natural resource base. This paper focusses especially on the role of animals in integrated systems, and in particular, the contribution of this sector to the development of sustainable agriculture.

400 Devendra, C. (ed.) 1988 **Non-conventional Feed Resources and Fibrous Agricultural Residues: Strategies for Expanded Utilization - proceedings of a consultation held on 21-29 Mar 1983 at Hisar.** Ottawa, Ont: International Development Research Centre / New Delhi: Indian Council of Agricultural Research. 194p.

Keyword(s): *Animal feeding / Agricultural wastes / Waste utilisation / South Asia*

Call No: 636.085 DEN

Lang: En

This publication specifically focusses on expanding the utilisation of non-conventional feeds and fibrous agricultural residues in South Asia (Bangladesh, Bhutan, India, Nepal, Pakistan and Sri Lanka). It notes the continuing problems related to chronic feed deficits throughout this region, and the inadequate efforts to reduce their magnitude. The current availability of the total feed resources and present patterns of utilisation by ruminants (buffaloes, cattle, goats and sheep) and non-ruminants (pigs, poultry and ducks) are discussed in the context of the opportunities for expanding development efforts, especially at the farm level in the future. The assessment of current status and need for extending the available information led to the formulation of development strategies to enhance large-scale on-farm utilisation of the available feeds with the participation of farmers, consistent with maximising productivity from the animal genetic resources which is presented in this paper.

401 Fine, J. C.; Lattimore, R. G. (eds.) 1982 **Livestock in Asia: issues and policies.** (IDRC, 202e). Ottawa, Ont: International Development Research Centre. 192p.

Keyword(s): *Livestock / Animal products / Asia*

Call No: 636 FIL

Lang: En

This book contains the papers presented at a conference on livestock in Asia. The first paper provides an overview of the livestock in the region. It traces out the current patterns of livestock production and identifies the factors that will affect the farm economy in future. The papers contained in the section on livestock production issues and domestic and international livestock marketing issues provides an effective framework for generating hypotheses concerning the decisions likely to be made by traditional framers. While some papers indicate the potential benefits to policy makers. Draft of empirical research conducted within a rigorous conceptual framework is also provided. Similarly, some papers are concerned with various components of the livestock food chain. They include consumer tastes, prices and marketing policies, processing and distribution, the availability of feed supplies, and international marketing considerations. The papers

contained in the section on national policy choices do not support to address all the issues. Rather they attempt to provide a national perspective as currently seen by researchers in Korea, the Philippines, Thailand, and Indonesia and to identify, in a preliminary fashion, the type of research needed by national policy makers. The paper in the final section on methodology anticipate some of the problems involved in conducting research.

402 Panayoton, J.; Jokrisna, R. 1982. **Microeconomics of rural livestock: the case of buffalo and cattle in Thailand.** In Time, J. E.; Lattimore, R. G. (eds.) **Livestock in Asia: issues and policies.** Ottawa, Ont: International Development Research Centre. 65-74p.

Keyword(s): *Buffaloes / Livestock / Animal production / Thailand*

Call No: 636 FIL

Lang: En

This paper discusses the role of livestock in the rural economy, the optimum holdings age for a single animal is determined, and the size of the herd and its age and sex composition are analysed. Complications such as dual-purpose animals, indivisibilities, and trade in draft animals are also mentioned. Finally, concluding remarks and implications for policy are given.

403 Pattern, B. E.; Spencer, T. L.; Johnson, R. B. 1993. **Pasteurellosis in production animals: proceedings of an International Workshop held on 10-13 Aug 1992 at Bali, Indonesia.** (ACIAR [Australian Centre for International Agricultural Research] proceedings, 43). Canberra, ACT: Australian Centre for International Agricultural Research. 256p.

Keyword(s): *Animal diseases / Animal production / Animal husbandry / Animal products*

Call No: 636.089623 PAP

Lang: En

The proceedings of agricultural research system workshop includes 14 discussion papers related to agriculture, livestock, research planning, project formulation, monitoring and evaluation, manpower training, and some others followed by a brief report on the activities of Pakistan Agricultural Research Council (PARC) technical divisions on crop science, natural resources, animal, and social science. Finally, recommendations passed at the workshop are also included.

404 Punj, M. L. 1988. **Availability and utilization of non-conventional feed resources and their**

utilization by ruminants in South Asia. In Devendra, C. (ed.) *Non-conventional Feed Resources and Fibrous Agricultural Residues: Strategies for Expanded Utilization* - proceedings of a consultation held on 21-29 Mar 1983 at Hisar. Ottawa, Ont: International Development Research Centre / New Delhi: Indian Council of Agricultural Research. 50-75p.

Keyword(s): *Agricultural wastes / Feed crops / Animal feeding / South Asia*

Call No: 636.085 DEN

Lang: En

The South Asian countries have a large livestock population with a very low level of production. The main reason for this poor animal production is their inadequate and low level of feeding due to very serious shortage of feedstuffs in the region. A major gap exists between the requirements and supplies of concentrates and green and dry fodders for feeding livestock in South Asia. The paper discusses the availability and utilisation of non-conventional feeds and inherent constraints. Rubber seed cake, sal seed meal, spent anatto seeds, tapioca waste, tea waste, babul seeds, slaughter house by-products, animal organic wastes, cassia tora seeds, mango seed kernels, niger seed cake, karanj cake, guar meal, vilayati babul pods, and cassava leaf meal are briefly described as potentially valuable feeds. Collection, dehydration for high moisture materials and detoxification processes are regarded as the main constraints to the use of non-conventional feed resources.

405 Rao, A. 1995. **The Muek-Lek Women's Dairy Project in Thailand.** In Leonard, A. (ed.) *Seeds 2: supporting women's work around the world*. New York: The Feminist Press. 91-109p.

Keyword(s): *Dairy industry / Women's participation / Milk production / Institutional framework / Thailand*

Call No: 305.4 LES

Lang: En

This paper provides brief information on the 'Muek-Lek Women's Dairy Project' in Thailand, which began in 1985. The paper presents its historical approach, finance, design, the feed mill cooperative, the process of collecting milk, its improved income, and lesson learned from running the project. Additionally, women in dairying: the Indian experiences is also provided in an Annex.

406 Remengi, J. V.; McWilliam, J. R. 1985. **Ruminant production trends in Southeast Asia and the South Pacific, and the need for forages.** In Blair, G. J.; Ivory, D. A.; Evans, T. R.

(eds.) *Forages in Southeast Asian and South Pacific Agriculture: proceedings of an International Workshop held on 19-23 Aug 1985 at Cisarua, Indonesia*. Canberra, ACT: Australian Centre for International Agricultural Research. 1-6p.

Keyword(s): *Animal production / Ruminants / Feed crops / Southeast Asia / Asia and the Pacific*

Call No: 633.2 BLF

Lang: En

The need for forage is a derived demand that cannot be divorced from factors that determine the demand for ruminant animals in developing countries. Therefore, the need forage inputs into the large ruminant sector will increase more than proportionately with growth in numbers. Production trends in ruminant populations and the need for forage in Southeast Asia and the Southern Pacific have been briefly reviewed in this paper.

407 Satari, G. 1985. **Interrelationship of ruminant production and socio-economic systems in Southeast Asia and the South Pacific.** In Blair, G. J.; Ivory, D. A.; Evans, T. R. (eds.) *Forages in Southeast Asian and South Pacific Agriculture: proceedings of an International Workshop held on 19-23 Aug 1985 at Cisarua, Indonesia*. Canberra, ACT: Australian Centre for International Agricultural Research. 12-14p.

Keyword(s): *Animal products / Economic aspects / Ruminants / Livestock / Southeast Asia / Asia and the Pacific*

Call No: 633.2 BLF

Lang: En

Ruminants appear to have been among the first animals to be domesticated by man. As hunting for wild animals became less and less successful, trapped ruminants were brought home alive and kept in confinement to become a food source in times of emergency. This confinement also gave man an opportunity to learn how to rear them and their offspring on the available forage. This paper highlights the benefits of ruminant production to the socioeconomic system as well as the constraints imposed by the socioeconomic systems. Some of the economic aspects are also dealt.

408 Stephens, A. 1990. **Women and livestock production in Asia and the south Pacific region.** Bangkok: FAO. Regional Office for Asia and the Pacific. 41p.

Keyword(s): *Livestock management / Women's participation / Women's role / Asia / Asia and the Pacific*

Call No: 305.4 STW P

Lang: En

Women's role in agriculture is a multiple one in which she is an integral part of a cropping and livestock production system on the small farm, but generally a mere labourer on larger farms or in agro-industry. In the pastoral systems of Mongolia, Tibet, and Baluchistan women are responsible for much of the care and shepherding of animals, but their major specialty is in smaller animal rearing and poultry. Although women produce about half the world's food their work remains for the most part invisible. This is especially true in the livestock sector. Small animal and poultry production for family use or for the market is usually women's work. The major responsibility for the care and feeding of larger animals generally rests with women. Dairying is traditionally a women's domain. Sericulture is mainly the work of women. Yet they are mostly discounted in production and employment statistics. This booklet sets out some of the important issues surrounding women's work in livestock production. It identifies constraints to their increased productivity and suggests action needed on the part of government to help women share in the development of livestock production as equal partners with men.

409 Tacio, H. D. 1992. **Contour farming and livestock raising: a likely combination.** Contour: newsletter of the Asia Soil Conservation Network 4(1):12-17

Keyword(s): *Contour cultivation / Farming systems / Livestock*

Call No: 631.4 CON

Lang: En

Contour farming and livestock raising is discussed in this paper as a likely combination to solve the environmental problem in the Philippines through the programme SALT (Sloping Agricultural Land Technology). The economic benefits generated through SALT are also given.

410 Tulloh, N. M. (ed.) 1991 **Buffalo and goats in Asia: genetic diversity and its application - proceedings of a Seminar held on 10-14 Feb 1991 at Kuala Lumpur, Malaysia.** (ACIAR [Australian Centre for International Agricultural Research] proceedings, 34). Canberra, ACT: Australian Centre for International Agricultural Research. 144p.

Keyword(s): *Buffaloes / Goats / Diversity / Genetics / Asia*

Call No: 636 TUB

Lang: En

The buffalo is still a key component of village systems of agriculture in Asia and its wellbeing and productivity have a major influence on, and in some

cases determine, the standard of living of the small farmers and their families in several countries in the region. The proceedings include the report of two projects which heighten the awareness of the potential benefits for the small holder farmers that can be derived from better utilisation of the buffalo genetic resources in the region. The main objective of these projects as mentioned in this report is to establish whether crossbreeding among buffalo types and strains leads to an increase in productivity, measured as growth, fertility, milk production and draught capacity, and to investigate the extent of the genetic variation among buffalo populations and among goat populations that could be identified using existing biochemical and karyotyping technology. According to this report these two projects have demonstrated two important principles, the first is that crossbreeding swamp and river buffalo has led to productivity increase, and the second is that there are substantial genetic differences among populations of swamp buffalo and among populations of goats from different regions in southeast Asia. Some results regarding the projects have also been highlighted in the proceedings.

411 Verma, M. L. 1988. **Availability and intensive utilization of cereal straws and fibrous agricultural residues in South Asia.** In Devendra, C. (ed.) *Non-conventional Feed Resources and Fibrous Agricultural Residues: Strategies for Expanded Utilization - proceedings of a consultation held on 21-29 Mar 1983 at Hisar.* Ottawa, Ont: International Development Research Centre / New Delhi: Indian Council of Agricultural Research. 21-32p.

Keyword(s): *Waste utilization / Agricultural wastes / Fibre crops / Straw / South Asia*

Call No: 636.085 DEN

Lang: En

South Asia possesses 64.1 per cent and 19.5 per cent of the cattle population of Asia and the world respectively. However, the cow's milk produced in this regions is very low. Low genetic potential and inadequate feed resources are generally considered to be the two major factors responsible for the low productivity. An analysis of feed resources in South Asian countries in terms of pastures and cultivated fodder per unit grazing livestock, quantities of indigenously produced feed grains, oil cakes and brans reveals that the situation is quite alarming. This paper examines the availability of feed resources, in particular cereal straws and fibrous agricultural residues, their present production and utilisation and possibilities of intensive utilisation of fibrous residues.

412 Watanabe, S. 1988. **A tether grazing method for cattle.** In Association for

International Cooperation of Agriculture and Forestry. Useful farming practices. Tokyo: Association for International Cooperation of Agriculture and Forestry. 255-256p.

Keyword(s): *Animal feeding / Grazing / Thailand*

Call No: 631 ASU

Lang: En

This paper provides a short illustrative information on the tether grazing method for cattle.

413 Yuen, C. F. 1994. **Animal feed resources: the exploitable potential for better use of locally available feed resources.** Asian livestock 19(1):1-5,12

Keyword(s): *Animal feeding / Feed crops*

Call No: 636 ASL

Lang: En

Livestock and poultry in Asia and the Pacific region are dependent on both important feedstuffs as well as locally available feed resources. Important feedstuffs are utilised to a varying degree for the production of compound feeds, particularly for poultry and pigs. Ruminants, however, depend very much on locally available feed resources. These resources vary in types, availability, usefulness and status of utilisation in different areas. It is well known that there is great potential in those resources, but it is equally acknowledged that there is still much room for improvement in this utilisation. In this paper, better use of locally available feed resources for animals and possibility of cultivating forage crops have been described in detail.

414 Zandstra, H. G.; King, D. J. 1982. **Technology changes and livestock development in Asia.** In Time, J. E.; Lattimore, R. G. (eds.) *Livestock in Asia: issues and policies.* Ottawa, Ont: International Development Research Centre. 167-174p.

Keyword(s): *Livestock / Farming systems / Asia*

Call No: 636 FIL

Lang: En

: Most animal products in Asia are still produced on small farms. Ruminants production on small farms in Asia strongly interact with crop production enterprises. Farming systems research has been extended to farming systems that include animal production. It has been developed in such a way that the site selection, description, testing, multiplication testing, and production programme formulation phases are conducted on local sites. Research by economists and other social scientists is also needed to determine market opportunities for and constraints to increase production, inputs costs, and availability, and the likely farm household response to increase

livestock production opportunities through modification of farming systems utilised and the use of household time and resources on off-farm activities. Research is also needed in agricultural sector, regional development, and social or equity policies that affect the relative prices of crop and livestock products and factors of production for particular socioeconomic or regional groups of farmers. This paper emphasises livestock production on small farm and some issues related to improve the contribution of that enterprise to farm productivity. Particular emphasis is placed on the role of production economists and their colleagues involved in planning and sector policy formulation in research aimed toward increased livestock production.

South America

415 Baied, C. A. 1989. **Transhumance and land use in northern Patagonian Andes.** Mountain research and development 9(4):365-380

Keyword(s): *Land use / Livestock*

Call No: 551.432 MOD

Lang: En

In the northern most Andean Patagonia, land use is characterised by the extensive exploitation of high and low altitude seasonal grasslands. This paper describes the transhumance and land use in the northern Patagonian Andes where, transhumance appears to be under an increasing pressure for change towards a more sedentary, intensive-oriented mode of production. The survival of long-time successful land-use practice is directly linked to aspects of land tenure, grazing strategies with native and non-native grasses, and livestock diversification. This paper also emphasises the need for the establishment of cooperatives of producers operating at the production and commercialisation levels, as well as for the active participation of pastoralists and regional communities in the decision-making process.

416 Cimo, P. 1988. **Alpaca, a symbol and a source of hope in the Andes.** Ceres: the FAO review 21(1):32-37

Keyword(s): *Alpacas / Animal husbandry*

Call No: 630.05 CEF

Lang: En

The alpaca are most widely found members of the camel family in the Andean countries. It is the domestic animal without which the people of that environment or region could not survive as it fulfils the requirements of the people. This paper focusses on the potential and prospects regarding the alpaca in the life of the Andean as a symbol and source of hope in the Andes.

417 Pasha, S. A. 1991. **Sustainability and viability of small and marginal farmers: animal husbandry and common property resources.** Economic and political weekly 26(13):A27-A33

Keyword(s): *Small-scale farming / Animal husbandry / Property rights*

Call No: 330.05 ECP

Lang: En

This paper examines the socioeconomic condition of small and marginal farmers in a drought-prone region. The method of farming adopted by the farmers to maximise their total returns is discussed. The role played by ruminant livestock and common property resource land in their economy is described. Finally, the constraints on the viability and sustainability of these resource-poor farmers are presented.

418 Smythe, N.; de Guanti, O. B. 1995. **Domestication and husbandry of the paca (Agouti paca).** (FAO conservation guide, 26). Rome: FAO. 86p.

Keyword(s): *Animal husbandry / Wild animals / Mammals*

Call No: 636 FOD

Lang: En

This document describes the method and means to domesticate and raise the paca, *Agouti paca*, a wild mammal from dense forests of South and Central America. It is shown that in changing the imprinted behaviour during early stages of life, the animal becomes sociable, loses its aggressivity and by living

in groups rather than in pairs, increases its reproductive rate, making its husbandry an economically viable enterprise. The husbandry of paca is considered as an interesting breakthrough because of its highly praised meat, and it may also relieve the hunting pressure on wild populations.

419 Sumar, J.; Camino, A. 1992. **The Andean camelids, llama and alpaca: the potentials and prerequisites for introducing these animals into other mountain environments.** (MFS [Mountain Farming Systems] discussion paper, 33). Kathmandu: International Centre for Integrated Mountain Development. 76p.

Keyword(s): *Ruminants / Alpacas / Animal husbandry*

Call No: 636.2 SUA

Lang: En

The Andean mountains are well-known for promising plant and animal resources, among which alpacas and llamas are an outstanding example. This document presents information about the habitat and the farming systems of the Andean highlands, of which these camelids are an integral part. Well-adapted to the high mountain farming systems, these alpacas and llamas are thought to have a potential for improving the high mountain agro-pastoral farming systems of the Hindu Kush-Himalayan region also. The paper mainly focusses on science and management of these animals and on the potentials and prerequisites for introducing these animals into the Hindu Kush-Himalayan region.

Pastoralism and Pastoral Development

General

420 Livingstone, I. 1991. **Livestock management and overgrazing among pastoralists.** *Ambio: a journal of the human environment* 20(2):80-85

Keyword(s): *Livestock management / Rangelands / Pasture management*

Call No: 304.2 AMB

Lang: En

Degradation of the range in pastoral economies is widely put down to the existence of a 'common property problem' (CPP) arising out of communal ownership and leading to excess holdings of livestock. Examining first the reasons for accumulating livestock in traditional livestock systems, this article looks more closely at the physical processes of range degradation, reviewing recent literature, and argues that inadequate account has been taken of the difference between average rainfall years and drought and immediate post-drought years in which degradation under the CPP, is concentrated.

421 Oxby, C. 1991. **The involvement of agropastoralist women in livestock programmes.** In Wallace, T.; March, C. (eds.) *Changing perceptions: writings on gender and development.* Oxford: Oxfam. 202-209p.

Keyword(s): *Women's participation / Women workers / Pastures*

Call No: 305.4 WAC

Lang: En

This paper first describes the involvement of agropastoralist women in livestock programmes. This is followed by brief description of two rare NGO projects which have attempted to involve women in animal production activities. Both are restocking projects. Recommendations for the betterment of the women involved in livestock programmes is also discussed.

422 Sandford, S. 1983. **Management of pastoral development in the third world.** Chichester: John Wiley. 316p.

Keyword(s): *Developing countries / Pasture management*

Call No: 333.74 SAM

Lang: En

This book presents information on pastoral societies and the management and organisation of pastoral development in the third world. There are eleven chapters in this book. The physical and analytic framework is discussed in the first chapter, which defines a number of important terms and concepts

which will frequently recur in what follows and has given some indication of the present extent of pastoralism and of many expectation about its future. The chapter also reviews current beliefs about the state of the world's rangelands and the causes for desertification. Objectives, strategies and instruments required for pastoral development is discussed in the second chapter. Third chapter focusses on the management and organisation in pastoral development. Fourth chapter outlines some of the important aspects of the development of pastoral water supplies. Fifth chapter concentrates on three aspects with the very broad scope of range management. Sixth chapter discusses the main aspects of range management. The full scope of organising the management for improving range productivity is discussed in the seventh chapter. Eighth chapter has focussed between different forms of organisation and management in some selected aspects of the improvement of animal health and animal husbandry. The scope of pastoral marketing and processing have been briefly reviewed in the ninth chapter. Chapter Ten focusses on the organisation of pastoralists seen as a whole over the broad range of their function in components. Chapter eleven concentrates on the organisation and management of government activities.

Afghanistan

423 Balland, D. 1988. **Nomadic pastoralists and sedentary hosts in the central and western Hindu Kush mountains, Afghanistan.** In Allan, N. J. R.; Knapp, G. P.; Stadel, C. (eds.) *Human impact on mountains.* New Jersey, NJ: Rowman & Littlefield Publishers. 265-276p.

Keyword(s): *Nomadism / Hindu Kush-Himalayas / Animal husbandry / Mountain people / Afghanistan*

Call No: 304.2 ALH

Lang: En

In this paper, Gujar in the central Hindu Kush and the Pashtun nomads in the Dasht-e-Nawar area are described as the nomadic pastoralists and sedimentary hosts in the Afghan Hindu Kush region based on their lifestyle and migratory process.

Bangladesh

424 Feldman, S.; Fazila Banu; McCarthy, F. E. 1992. **The role of rural Bangladeshi women in livestock production.** In Dove, M. R.; Carpenter, C. (eds.) *Sociology of natural resources in Pakistan and adjoining countries.* Lahore: Vanguard Book. 347-371p.

Keyword(s): *Livestock management / Women's role / Rural women / Bangladesh*

Call No: 333.7 DOS

Lang: En

The purpose of this paper is to document women's participation in the production of livestock in Bangladesh. Based on data collections from four villages in two region, the paper also examines the social relation of livestock production focussing primarily on factors of family status and gender. It is hypothesised that specific activities which different family members perform in the production of livestock vary by configuration of household membership and the family control of productive resources.

Bhutan

425 Asian Development Bank. 1988. **Bhutan: women in development profiles in highland livestock development.** Manila: Asian Development Bank. 34p.

Keyword(s): *Women's participation / Livestock / Bhutan*

Call No: 305.42 ASB P

Lang: En

This document examines the situation of Bhutanese women in relation to government policies, legal aspects, cultural and social customs, their economic role and bank operations: analyse their needs and impact with regard to the bank-assisted Highland Livestock Development Project. Covering the general issues on Bhutanese women, the profile also highlights how their role was effectively integrated into the project.

China and the Tibetan Plateau

426 Clarke, G. E. 1988. **China's reforms of Tibet and their effects on pastoralism.** *Kailash: a journal of Himalayan studies* 14(1,2):63-131

Keyword(s): *Pastures / Animal husbandry / Economic conditions / China, Tibet*

Call No: 301.05 KAJ

Lang: En

This paper attempts to describe the situation as it existed in 1986 in certain areas of the Tibetan Autonomous Region (TAR), between the high Himalayas, the ranges of the northwest Tibetan Plateau and Central Tibet. It describes the natural and social conditions of Tibet. Which gives the ecological particularities, national characteristics, the economic structure of the region and the living conditions of the people as they are and brings these factors together in the explanatory context of their

particular historical situation. The centre of this account is a presentation of original field research in the form of case-studies on households and communities. The main portion of the paper presents the original case-studies from recent field research among pastoral communities in south-western and central Tibet, in particular the Lake Namtsho area on the southeastern fringes of the Changthang plateau, and in the Shigatse prefecture. These are considered in the context of the ecological and a wider institutional framework, one that includes both traditional and wider administrative features. This account is then interpreted in the context of recent and continuing institutional and economic changes, which is rounded off by some practical conclusions and implications for applied research.

427 Miller, D. J. 1995. **Herds on the move: winds of change among pastoralists in the Himalayas and on the Tibetan plateau.** (MNR [Mountain Natural Resources] discussion paper, 95/2). Kathmandu: International Centre for Integrated Mountain Development. 20p.

Keyword(s): *Pasture management / Pastures / Herbs / Himalayas / Grassland management / China, Tibet*

Call No: 574.52643 MIH P

Lang: En

Rangelands cover about one-third of the Himalayan land areas and over three-fourths of the Tibetan plateau. A large livestock population and possibly 10 millions livestock dependent people reside in these mountain grazing lands, along with a unique assemblage of large wild ungulates. Most of Asia's major rivers originate in these rangelands and what takes place in these headwaters ecosystems has far reaching effects on downstream areas which have not been fully measured. Factors, such as geographical extent, biodiversity conservation, environmental protection, economic development, and human welfare, suggest that Himalayan and Tibetan rangelands should be a priority area for development, but, unfortunately, they are not. This paper examines some of the reasons why the rangelands and pastoralists on the Tibetan frontier have been ignored, and describes changes taking place on the rangelands, discusses issues facing pastoralists, highlights new perceptions emerging to help explain rangeland dynamics and pastoral systems and outlines factors to be considered in developing strategies for pastoral development in the region.

India

428 Chatterjee, P. C. 1989. **Nomadic graziers of Garhwal.** In Singh, T. V.; Kaur, J. (eds.)

Studies in Himalayan ecology and development strategies. New Delhi: Himalayan Books. 93-99p.

Keyword(s): *Nomadism / India, UP, Garhwal*

Call No: 574.5264 SIS

Lang: En

The geographical features of the Himalayas limit the choice of basic occupations for its inhabitants for agriculture and grazing. Agriculture is the main occupation in the broader river valleys lower down and on the lower hills, and pasturing cattle, which is taken up has a supplementary occupations here, gains importance with gain in altitude and assumes the main role on the high table-lands and the still higher hill-slopes of the greater Himalayas. And further up, as the barrenness of the hill slopes increases, grazing becomes the main source of livelihood. The life in these remote impregnable hills is very arduous, howsoever laborious and dedicated the inhabitants may be, they find it very difficult to earn a livelihood. Thus, like variations in the geographical features and the climate, difference is also found in the people and their way of life especially migratory habits. This paper proposes to discuss the people here, one by one, on the basis of their origin, their habitat and habits.

429 Rao, A.; Casimir, M. J. 1985. **Project: pastoral niches in the western Himalaya (Jammu and Kashmir).** [15]p.

Keyword(s): *Economic conditions / Nomadism / Tribes / Pastoralism / Jammu and Kashmir*

Call No: 636.08551 RAP P

Lang: En

This report briefly reviews the descriptive note on the traditional adaptive strategies of the mobile pastoral communities. Data presented in this report represents the basic results on research projected on the pastoral niche in a part of the western Himalayas. The report shows that although the broad features of their subsistence strategies are very similar, there is a variation in the detail aspects of resources exploitation. It also shows that each group partly breeds different types of livestock and partly utilise various biotypes within a given region, but at different altitudes.

Nepal

430 Dhungel, B. P. 1987. **Sociocultural and legal arrangements for grazing on public land: case study of Bahadurganj.** (Natural resource management paper, 11). Kathmandu: Winrock International Institute for Agricultural Development. 10p.

Keyword(s): *Animal husbandry / Legal aspects / Social aspects / Grazing land / Nepal, CDR*

Call No: 636.084 DHS P

Lang: En

The interdependence of crop farming and animal husbandry has been an important feature of the Nepalese rural economy, particularly in the Terai. But growing demand for food for the ever-increasing human population has led to a decline in public grazing lands. Therefore, the practice of grazing animals on public land has almost died out. A decline in grass availability on public lands has induced individual farmers to prohibit others from grazing on their private fallow. Because of numerous legal loopholes, legal provision to protect public lands from encroachment are ineffective. Specifically, the paper documents and analyses exiting legal arrangements related to public land, especially public pastures, that determine the importance of pasture as a sources of feed/fodder. It also documents social and cultural arrangements for grazing and public pasture management. Suggestions and measures to improve grazing management of public land is also provided.

431 Miller, D. J. 1987. **Yaks and grasses: pastoralism in the Himalayan countries of Nepal and Bhutan and strategies for sustainable development.** Missoula, MT: University of Montana. 109p.

Keyword(s): *Yaks / Rangelands / Grassland management / Pasture management / Nepal / Bhutan*

Call No: R 636.293 MIY

Lang: En

This paper draws on years of personal experiences of the author in the Himalayas and an extensive literature review to describe the range and livestock resource of some of the highest altitude rangelands in the world. The pastoral situation, rangeland reserves, topography, climate and vegetation of Bhutan and Nepal is described, followed by a brief description on domestic yak and their role in pastoral product systems in the Himalayas. Present-day concerns and constraints associated with pastoralism in Bhutan and Nepal are discussed. Strategies for sustainable development is outlined. Viable pasture development strategies and range management programme is suggested to be implemented in the Himalayas, so that the rangeland remains productive resource of forage for livestock and wildlife.

432 Rai, N. K.; Thapa, M. B. 1993. **Indigenous pasture management systems in high altitude Nepal: a review.** (Research report, 22). Kathmandu: Winrock International Inst. for Agricultural Development. 81p.

Keyword(s): *Pasture management / Traditional technology / Hills / Nepal*

Call No: 633.202 RAI

Lang: En

Animal husbandry is fundamental to the socioeconomy of the high altitude areas of Nepal. While the agricultural sector in these areas pivots around it, the centuries old trans-Himalayan (Nepal-Tibet) trade has also depended on animal husbandry for pack animals. It is also an important element in the social structure of the local populations. This report argues that indigenous management systems have been particularly effective for maintaining productivity at levels sufficient to meet local needs over a long period of time. The report also argues that the people in rural communities possess detailed knowledge of their local ecosystems and know effective ways of ensuring sustainable use. The report further argues that, in spite of their effectiveness in the management of resources, indigenous systems have for the most part been ignored in the formulation of natural resources management policies in Nepal. This paper provides a description and an analysis of successful practice of animal husbandry based on indigenous pasture management.

433 Thapa, M. B. 1993. **Indigenous pasture management systems in high altitude Nepal: a review.** In Tamang, D.; Gill, G. J.; Thapa, G. B. (eds.) *Indigenous management of natural resources in Nepal: proceedings of the Workshop on Indigenous Management of Agriculture and Natural Resources*, held on 8-9 Jun 1992 at Dhulikhel, Nepal. Kathmandu: Winrock International Inst. for Agricultural Development. 290-298p.

Keyword(s): *Pasture management / Traditional technology / Highland / Nepal*

Call No: 333.7 TAI

Lang: En

Livestock rearing is the primary source of economic survival for the inhabitants of the high-altitude areas of northern Nepal. One of the main problem is the unavailability of adequate quantities of animal forage, especially in the winter. This paper reviews the indigenous pasture management systems in high altitudes of Nepal. These systems of pasture management stem primarily from local knowledge and experiences to ensure an effective system of animal forage production and allow the sustainable use of pasture resources. The paper clearly indicates that external efforts to bring about pasture development must be recognised and incorporate components of indigenous pasture management.

Pakistan

434 Buzdar, N. M. 1992. **The role of institutions in the Management of commonly owned rangelands in Baluchistan.** In Dove, M. R.; Carpenter, C. (eds.) *Sociology of natural resources in Pakistan and adjoining countries*. Lahore: Vanguard Book. 218-238p.

Keyword(s): *Rangelands / Pasture management / Pakistan, Baluchistan*

Call No: 333.7 DOS

Lang: En

The semi-nomadic tribes of Baluchistan have for centuries, managed their resources on more or less sustained levels and lead a subsistence, but contented life. But, Baluchis today are faced with economic, political and social realities which endanger not only their way of life but also the resources on which they have depended for a living. The author has studied the problem at the local level in a selected area of Baluchistan. The main objective of the study being to evaluate local rangeland resources and their uses and to study the role of institutions in the management of resources. This paper, based on the above study, focuses on the importance of property rights and tenure-related institutions in determining or influencing stocking rates and productivity levels.

435 Carpenter, C. 1992. **The impact of afforestation on women: the development of marginal lands and female fodder collectors in Pakistan.** In Dove, M. R.; Carpenter, C. (eds.) *Sociology of natural resources in Pakistan and adjoining countries*. Lahore: Vanguard Book Pvt Ltd. 330-346p.

Keyword(s): *Afforestation / Women's participation / Women's role / Fodder plants / Pakistan*

Call No: 333.7 DOS

Lang: En

Women have a vital monopoly over the livestock production portion of small farm operation in Pakistan. This source of income is dependent on the availability and quality of fodder. Yet, fodder availability is rarely considered by development efforts aiming to transfer agriculturally-marginal land into woods lots or forests. This paper focuses mainly on livestock production and women in Pakistan and also describes and compares three different patterns of livestock production in Pakistan and their implications for the afforestation of fodder-producing lands.

Africa

436 Barrow, E. G. C. 1991. **The challenge for social forestry extension work in pastoral Africa.** (Social forestry network paper, 12e). London: Overseas Development Inst. 36p.

Keyword(s): *Community forestry / Forestry research / Africa*

Call No: 634.9 BAC P

Lang: En

Pastoral societies, where people live in fragile and vulnerable ecosystems, are often well adapted to harsh environment. Over time, they have gathered a vast repertoire of local knowledge about their resource base, its weaknesses and strengths, its utilisation and management. This was the form of farmer (pastoralist) participatory research before any such formed research existed. It is complex and based on a whole range of survival and insurance measures that help against the inevitable hard times due to drought and formal disease, and the vagaries of climate. This paper describes people's participation in the development process in the dry lands, to show why and how this can be achieved in a real and meaningful way. In a real way by trying to help create social responsibility for natural resource management, not just around settlements and discrete tree-planting, but as part of the wider management system in dry lands. The Turkana forestry extension programme is looked at as a case study that could form a basis to be adapted in other dry and pastoral lands in Africa.

437 Conyngham, J. 1989. **Interrelation and ethnoecology of Samburu pastoralists, dorobo foragers, and local fauna in Northern Kenya.** TRI [Tropical Resources Inst.] news (7):6-8

Keyword(s): *Pastoralism / Food crops / Fauna / Kenya*

Call No: 634.9 TRN

Lang: En

This paper focusses on the culturally, economically, and ecologically significant interrelations between Ariaal Samburu pastoralists, local fauna, and their ecosystem in the Ndoto Mountains and Marsabit region of north Kenya. Leading hypothesis patterns and processes related to the cultural and economic interactions are pointed out. Finally, the workplan of the project to analyse the abundance, distribution, movement, and economic activities of herders and foragers is presented.

438 Coppock, L. 1993. **Pastoral women harvest hay for calves.** ILEIA [Informationcentre for Low External-Input and

Sustainable Agriculture] newsletter 9(3):16-17

Keyword(s): *Women workers / Animal feeding / Feed crops / Ethiopia*

Call No: 631.8 ILN

Lang: En

Despite major economic changes in Africa, livestock production has remained the main engine of the livelihood systems in semi-arid areas such as Borana. To reduce the incidence of calf mortality, better feeding is often proposed. Improved calf-feeding can enhance animal production, as shown by Borana pastoralists in southern Ethiopia. Exotic inputs are not needed, instead, native grasses and legumes can be used more effectively by harvesting some for later use. Borana women, who are traditionally responsible for managing calves, have been trying out new techniques in haymaking.

439 Hamida, E. B. 1990. **Nomadic herders: learning from the past.** International agricultural development 10(3):10-11

Keyword(s): *Livestock / Animal husbandry / Nomadism*

Call No: 630.5 INA

Lang: En

Pastoralism plays a considerable role in the economics of the drought-prone countries of sub-Saharan Africa, and also in the management of their resources. This article provides the information on nomadic herders and their economic condition due to pastoral development in the west African country.

440 Kettel, B. 1989. **Women and milk in African herding systems.** In Rathgeber, E. M.; Kettel, B. (eds.) *Women's role in natural resource management in Africa.* Ottawa, Ont: International Development Research Centre. 87-101p.

Keyword(s): *Dairy industry / Animal husbandry / Milk production / Women's participation / Africa*

Call No: 305.42 RAW

Lang: En

This paper constitutes a plea for a new focus in research on the productive activities and responsibilities of women in the African rangelands. It calls for a new vision of the importance of women's work in livestock herding, particularly a new view of women's responsibilities in the provision of milk. This plea is intended as a challenge to the enduring invisibility of women in African herding systems and as a new approach to the recognition of women's interests in pastoral development. This paper provides a preliminary overview on women and milk in African herding systems as it relates to women's

use of pastoral resources including livestock, water, and fodder and to the consequences of commoditisation, drought, and pastoral development on women's lives.

441 Perevolotsky, A.; Perevolotsky, A.; Noy-Meir, I. 1989. **Environmental adaptation and economic change in a pastoral mountain society: the case of the Jabaliyah Bedouin of Mt. Sinai region.** Mountain research and development 9(2):153-164

Keyword(s): *Livestock management / Mountain environment / Pasture management*

Call No: 551.432 MOD

Lang: En

The high mountain region of southern Sinai is an 'ecological island' surrounded by desert. The elevation and rock formations create a variety of habitats, each with a characteristic water regime, microclimate, and vegetation. The local Bedouin, members of the Jebaliyah tribe, practise goat and sheep husbandry as a part of their subsistence. This paper discusses the system of livestock production and management typical to the Mt. Sinai region, including the environmental, economic, cultural, and political factors. Special attention is given to the migration movements, both horizontal and vertical, which are an essential component of the Bedouin's adaptation to the specific environmental conditions of this arid mountainous area. The paper also presents an analysis of the dramatic changes in Bedouin livestock husbandry during the Israeli rule as compared with the Egyptian era and attempts to point out the principal underlying factors behind these changes. An epilogue outlines the further changes that followed the return of the Mt. Sinai region to Egyptian rule in 1979.

Europe

442 Rinschede, G. 1988. **Transhumance in European and American mountains.** In Allan, N. J. R.; Knapp, G. P.; Stadel, C. (eds.) Human impact on mountains. New Jersey, NJ: Rowman & Littlefield Publishers. 96-108p.

Keyword(s): *Mountain farming / Transhumance / Livestock management / Europe, United States*

Call No: 304.2 ALH

Lang: En

The livestock industry represents the only possible kind of land use in the extreme climatic conditions found in many regions of the world. It appears in various economic forms as sedentary livestock industry, as migratory livestock industry, and as stall-feeding, which includes keeping livestock in feedlots. This paper highlights transhumance as a part of the migratory livestock industry in European and American mountains along with its distribution and the general environmental conditions. Importance and decline of transhumance is also briefly described.

South America

443 Hess, C. G. 1990. **Moving up – moving down: agro-pastoral land use patterns in the Ecuadorian Paramos.** Mountain research and development 10(4):333-342

Keyword(s): *Pasture management / Land use / Ecuador*

Call No: 551.432 MOD

Lang: En

This paper discusses present day land-use patterns in the northern Andean paramos. The various agricultural and pastoral production systems of this high mountain region are presented systematically and their organisation is explained. Two contemporary land use strategies have been focussed and discussed that are on the upward expansion of the agricultural frontier and the escalation of market-oriented animal-raising activities in the lower ecozones of the paramo communities. Historical and social causes that led to these recent trends and their negative ecological consequences for the rest of the country have also been discussed.

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Participating Countries of the Hindu Kush-Himalayan Region

- ★ Afghanistan
- ★ Bhutan
- ★ India
- ★ Nepal

- ★ Bangladesh
- ★ China
- ★ Myanmar
- ★ Pakistan

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