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 Developemnt 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 Developemnt 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 empahsis 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 (*Viteveria 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 prevelant 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 (*Viteveria 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 Gatshel 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 comparision 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, despitė 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. **Agro-climatic 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 competitional 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 competitional 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. Quadrate 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 hervibores, 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 protected 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 over-populated 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 convertors 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 Garwhal 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 interwined. 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:*Prassiopsis glomeruleta, Prassiopsis hainla, Ficus neriifolia var. nemoralis, 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 occational 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. DLDAH-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 Muktinanth 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 Parkhribas 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 Mecchegaon 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 the 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 fed shortages both in winter and in summer, coupled with degradation of grazing lands, due to overgrazing, salinity, solicity 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 Developemnt 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 pertubated 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-convential 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 *Mannetje, 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-lnds/Grassland management/ Agriultural training/Agricultural research/ South East Asia*
Call No: 634.956 TUA **Lang**: En

This paper highlights the edaphic, climatic, ecological, sivicultural, 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 feed-back 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.